

# BUTANE-PROPANE

## *News*

25¢

*Tomorrow You'll See...*




*Producers Marketers*

**BUTANE**  
*and*  
**PROPANE**

ANCHORGAS DELIVERED BY  
TANK CAR OR TRANSPORT TRUCK

*Petroleum Company*  
*Tulsa, Oklahoma*

APRIL 1943



*Deep drawing  
made it light and  
strong enough to fly*



*This cylinder, a reservoir of hydraulic energy for aircraft use, is another example of the way in which the Hackney Deep Drawing Process helps manufacturers strengthen and reduce the weight of parts simultaneously.*

Hydraulic energy to feather propellers, operate landing gear, flaps, etc., requires accumulators which are light in weight, yet are strong enough to withstand high internal pressures.

#### **Hackney Cylinders**

This is but one of the many products developed by Hackney engineers to meet the exacting requirements of wartime service. Hackney production today is 100% for war—and Hackney

Cylinders, like so many other products, will have to wait until after the war. Meanwhile Hackney products will be on the war front—helping to bring the day of Victory closer.

And when that long-hoped-for day arrives, the L-P Gas industry will benefit by the wartime research and experience of Hackney. It will result in better, high-quality L-P Gas Cylinders with greater advantages for the industry.



**Pressed Steel Tank Company**

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**CONTAINERS FOR GASES, LIQUIDS  
AND SOLIDS**





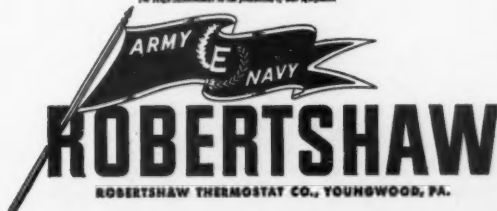
"Baste Frequently!" We here at Robertshaw are giving that well-known cooking term a wartime meaning. To us, "Baste Frequently" means Baste the Axis—early and often.

# "Baste Frequently"

And that's just what we're helping to do. From our years of experience in making precision devices such as thermostats, we've turned to the production of precision instruments for aircraft—devices our fliers are using this very minute to "Baste the Axis." And to help our boys "Baste Frequently," we're also producing fuses for hand grenades, primers and ignition cartridges for rockets, as well as boosters and shells for aircraft and anti-aircraft guns.

And with it all, you'll still find a few Robertshaw Thermostats coming off our production lines. They're only for Government projects though—thus keeping our hand in practice for peacetime requirements when that grand day arrives.

For High Reliability in the production of our equipment



APRIL-1943



# BUTANE-PROPANE *News*



Reg. U. S. Pat. Off.

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# Need ENGINEERING assistance?



When time is of the essence, why struggle with problems involving heat applications, when there is a trained and fully staffed engineering force who are specialists in this field. ☆ These men are thoroughly conversant with all commercial and industrial applications of heat... whether it be space heating, drying, cooking, burning, baking, material heating. It makes little difference whether you need a small hand torch or the complete design and erection of a Butane power or standby plant — our engineers are ready to serve you with production equipment when possible, and with special designs when necessary. ☆ Your inquiries are invited.

## RANSOME COMPANY

*Designing and Constructing Engineers*

4030 HOLLIS STREET • EMERYVILLE, CALIFORNIA

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# LETTERS

Gentlemen:

For our information, would you please advise if there are any regulations for insulating and grounding railroad track used when unloading butane gas from car to storage tank? This track is a siding, and used only for spotting car adjacent to storage tank for unloading.

A. C. D.

Arkansas

The National Board of Fire Underwriters recommends grounding when unloading LP-Gas from tank cars, but we believe there is no regulation specifically so ordering. Some railroads have their own regulations regarding insulating and grounding for the unloading of gasoline cars, and they often apply that regulation to LP-Gas unloading.

This would seem to indicate that it would be wise to use grounding precautions, but the particular railroad handling your product would have to indicate its own regulations beyond that point.—Ed.

Gentlemen:

On Page 25 of the February issue there is an article entitled "Gas Fire Losses Smallest Among Competitive Fuels."

Will you please give us the address of the National Fire Protection Association in order that we can get copy of the publication as shown in February issue of BUTANE-PROPANE News.

C. C. G.

Michigan

The address of the National Fire Protection Association is 60 Batterymarch St., Boston, Mass.—Ed.

Gentlemen:

I am wondering if you have any printed material showing that the bottled gas industry is classed by the

government as an essential industry. If not, could you write a letter showing that it is essential? I am a bottled gas distributor in an agricultural community.

L. J. S.

Wisconsin

As far as we know there has been no definite order covering such lines of business specifically. If you are performing a service essential to farmers it is possible you would be granted exemption if you present your case to your local board. On falling to secure relief there, you could take the matter up with Washington. See editorial on Page 11, this issue, for late reference.—Ed.

Gentlemen:

I have seen some contracts in certain oil fields where carbon black plants purchase from casinghead gas plants the "stripped gas," that is gas stripped of the butane and propane hydrocarbons. For this stripped gas about one-third (1/3) the price is paid as the carbon black plant pays for the original residue gas coming from the plant containing the butanes and propane.

Is this difference in price based on the fact that the original residue gas, with the butanes and propane, has about three times more B.t.u.'s per cubic foot than the gas stripped off of the butanes and propane?

What is it in the make-up of the gases that determines the prices carbon black plants will pay for the gases—one containing butanes and propane, the other stripped of the butanes, and containing the ethane and methane molecular elements, only?

In other words about what are the

relative carbon black values of the two gases? Why the difference in prices.

S.P.R.

Oklahoma.

Carbon black is produced by burning fuel with insufficient oxygen for complete combustion, causing the formation of soot or carbon black.

The greater the B.t.u. value of the gas burned, the fewer cubic feet are required to produce a pound of carbon black.

The price of fuel is determined by the available market and the B.t.u. value.

To determine the B.t.u. value of a cubic foot of gas, determine the percentage of each component in the mixture and multiply these percentage figures by the heating value of the individual components.

One method is to make a direct laboratory determination of the heating value of the mixture by the calorimeter method.—Ed.

Gentlemen:

As a matter of interest to us here in the East, could you give us any information as to the relative mileage obtained by use of a gallon of propane as compared to that of a gallon of gasoline, in the same car, under the same conditions?

We understand that butane is quite widely used in the West, but have had no opportunity to observe or experiment with the use of propane for automobiles in this area. This time is as good as any to learn for the future.

F. J. M.

New York

Extensive experience on the Pacific Coast, where the range of activity runs from private passenger car usage to that of heavy-duty trucks and tractors, has shown that the advantages of butane or propane do not lie so much in greater mileage obtainable from the use of those fuels, as from improved performance, lower maintenance cost and reduced oil consumption.

Propane and butane, being gases, are completely consumed in the engine, leaving no residue to dilute the oil in the crankcase. Users of LP-Gas find it very commonly true that they can operate their equipment from two to four times as long before engine overhauls than they could formerly on gasoline.

When close to the source of supply such as in oil producing states, the price of butane

is considerably less than gasoline, and that gives our fuel a favorable differential in cost per gallon. In the East that fact would not hold so true. All-in-all, there is no question but what automotive equipment using LP-Gas has a far better record than when gasoline is used.—Ed.

Gentlemen:

Please advise if you can supply us with the names of the manufacturers of the Victory model gas range.

E. S.

Texas

The name of "Victory" range designates the range which any manufacturer in Class "C" may construct for the trade, and it is so called because it is of light weight and devoid of many refinements which were customarily added to such equipment before Government limitation orders became effective.

There are about two hundred manufacturers whose location and volume of business permit them to manufacture the "Victory" range and this list may be obtained from the War Production Board, Washington, D. C. It was published at the time Order No. L-23-c was issued on last May 15.—Ed.

Gentlemen:

Can you furnish or direct us to sources of information on heat rechargers for commercial butane plants and if any catalogs are available on this subject?

C. W. B.

California

We assume that you mean heat exchangers or vaporizers. Manufacturers of this equipment include the following: American Liquid Gas Co., 1109 So. Santa Fe Ave., Los Angeles; Ransome Co., Emeryville, Calif. Southern California agents for the Ransome Co. is the Electric & Carburetor Engineering Co., 2323 East 8th St., Los Angeles.—Ed.

We have no catalogue covering vaporizers but you will get all the necessary information from the manufacturers.—Ed.

● BUTANE-PROPANE News welcomes letters from our readers, but it must be understood that this magazine does not necessarily concur in opinions expressed.—Editor.

# *Cooperate!*

By ERNEST FANNIN

President, Fannin's Gas & Equipment Co., Phoenix, Arizona

**W**E feel a good slogan and watchword for our industry of today and tomorrow is "Cooperate." This entails the shedding of all selfish interests and the development of a strong "United Front." Like the Allied Nations, cooperation and purposeful program designed for international well-being and understanding is essential.

In our industry the agency for collective united action is the National Liquefied Petroleum Gas Association. Through it we have achieved national recognition, and on the main strengthened the position of our business during the chaotic times we are now experiencing.

Cooperation should not and cannot stop with the National Association. It must be carried to the "Home Front," the area of operation each of us serves. This spirit must prevail not only among each company's "family of dealers," but wholeheartedly extended to your competitors. Such collective action definitely will promote your personal case. This can be achieved by cooperative action in the exchange of product, sharing transportation facilities, assistance in and borrowing of maintenance and operating supplies, the exchange of priority and government regulation information.

This concurrence in action gives LP-Gas a stronger foundation, a buyer's confidence in the reliability, serviceability and availability of our products. Thus to cooperate means "to concur in action, effort, and effect."



**ERNEST FANNIN**  
**Guest Editor for April**

**APRIL-1943**

We're Serving a Foreign  
Market Just Now . . .



Precision-built metal containers for bomb parachutes are bad news for the axis from sheet metal workers at Lindemann & Hoverson. Metal tool and control boxes have replaced ranges and stoves in L & H production. Cartridge belts now come from

our stove wick looms. The facilities of this vast production plant are in the service of the United Nations.

In thus helping Uncle Sam, this pioneer stove manufacturing



organization is perfecting new precision methods of manufacture that will be apparent in improved L & H products. . . . In your planning for peace, keep L & H in mind.



**A. J. Lindemann & Hoverson Co.**

MILWAUKEE • Since 1875 • WISCONSIN

**KEROGAS**

MANUFACTURERS OF ELECTRIC RANGES . . . ELECTRIC WATER HEATERS  
GAS RANGES.. OIL STOVES . PORTABLE OVENS OIL HEATERS...WICKS

**ALCAZAR**



# MAINLY BEYOND THE MAINS

By ELLIOTT TAYLOR, Washington Editor

## The Month

WPB certainly took its time about appointing an industry advisory committee for LP-Gas, but the committee has finally been selected and has held its first meeting in Washington with government representatives. It is our opinion that the group represents a good cross-section



ELLIOTT TAYLOR

of the entire industry and that every type of operation and every section of the country will find itself adequately and intelligently represented. The important thing now is not to quibble over the personnel but to unite behind those who are serving to the end that their efforts may be productive of the maximum of service to the prosecution of the war with as little disruption of the industry as is possible.

It is possible, of course, that when and if LP-Gas is transferred from the jurisdiction of WPB to that of PAW some changes in the committee set-up may be made. But since PAW

has a well developed technique of working through industry representatives, it is almost a foregone conclusion that some such committee will be retained.

Selected by WPB to attend the organization meeting were: Peter Anderson, Utilities Distributors, Inc., Portland, Maine; Frank Boice, Shell Oil Co., Inc., New York; Walter Naumer, "Pyrofax" Gas Division, Carbide and Carbon Chemicals Corp., New York; John Clark, Standard Oil Co. of New Jersey, New York; K. H. Koach, Green's Fuel, Inc., Sarasota, Fla.; Louis Abramson, Jr., Petrolane Gas Corp., New Orleans; George Bach, Skelly Oil Co., Kansas City; C. D. Whittfield, Phillips Petroleum Co., Bartlesville, Okla.; G. L. Brennan, Warren Petroleum Corp., Tulsa, Okla.; W. T. Joplin, Butane Corp., Phoenix, Ariz., and D. D. Purrington, Standard Oil Co. of Calif., San Francisco.

Pointing up the No. 1 problem of the industry—transportation—the matter of tank cars, tank trucks and storage facilities was discussed in great detail and two task forces were set up to report to WPB, one on tank car and tank truck requirements and the other on the amount of cross or back



hauling that is now being done in transporting butane and propane from points of production to distribution systems.

There have been many opinions and much advice floating around on the subject of making fuller use of existing transportation equipment, but too little of it has been based on a complete and accurate knowledge of the facts regarding the actual amount of such equipment in use, and the extent to which it is being employed at full capacity. With the advice and assistance of the industry committee, we believe these facts can be uncovered by WPB in time to make adequate provisions for the peak loads that will be encountered later in the year, and in the winter of 1943-44.

The truth of the matter is that in many instances the industry just about managed to squeeze through the past winter, and the Rubber Reserve Corp. has now started the withdrawal of its cars that were temporarily in LP-Gas service. As this withdrawal proceeds, there will be increasing necessity to make the fullest utilization of the remaining equipment if the increasing demands of the gas fuel market are to be met.

\* \* \*

Present indications are that cooking and heating appliances are to be placed on a rationed basis with local rationing boards having the authority to approve or deny requests for new appli-

ances in much the same way that farm machinery and equipment is now rationed. This will be administered under OPA control. There also appears to be a good chance that Class A stove manufacturers will be permitted to resume production on approved models of gas ranges. Class C manufacturers eligible to produce ranges have not turned out either the volume or the quality of product necessary to take care of the new demands for essential cooking equipment. Limited production of gas-fired space heaters may also be permitted, according to current anticipations in Washington.

Whether the new production will be permitted in labor shortage areas, however, is doubtful. We believe that rationing of cooking and heating equipment through local boards may well work to the benefit of the industry. Obviously, the number of applications received, and the number that will have to be denied will serve to indicate definitely the volume of unfilled essential demand, and should this demand be great enough may lead to further relaxation of the prohibitions against gas appliance manufacture.

\* \* \*

Following the meeting of the LP-Gas industry advisory committee in Washington, the executive board of the Liquefied Petroleum Gas Association held its annual meeting and election of officers. Louis Abramson, Jr., of Petrolane Gas Corp., was

elected president of the association for the ensuing year, with D. D. Purrington, of Standard Oil of Calif., and H. K. Strickler, of Protane Corp., vice presidents.

The board acted wisely, in our opinion, in calling off the so-called customer attitude survey that had been proposed by the Advertising and Sales Promotion Committee. Carl Sorby, chairman of the committee, is now working up a plan for a straight publicity campaign, to keep the industry in the public eye for the duration of the war which shows greater promise of long range, specific value. The campaign will probably cost about twenty-five thousand dollars, and will rely on press releases and feature stories planted in trade and general publications to tell the butane-propane story.

Such a program to be successful must have the backing of every element in the industry, which means it cannot be thrown off onto the manufacturers of appliances and equipment.

In the stress of dealing with emergency problems growing out of the war there is a tendency, particularly on the part of the already overworked and harassed dealers, to let such intangibles as post-war problems take care of themselves. Nothing could be more fatal to the future of LP-Gas, or play more directly into the hands of the electrical competition. The so-called electronic range, about which there is a great deal of

inspired whispering, is only one of many indications that the electrical industry expects to get back into the cooking picture in one mighty leap as soon as the war is over.

\* \* \*

The question of draft deferment for employees of LP-Gas operators seems to have been clarified somewhat by the recent opinion by a representative of Selective Service that this will be regarded as an essential industry. This means six months' deferment may be obtained for workers who have special technical knowledge or skill necessary to the functioning of a gas distributing organization. Truck drivers, for example, are in many cases qualified to regulate, inspect and service the appliances of customers on their routes. In presenting such a case to a local draft board this aspect of the drivers' service should be carefully noted, rather than placing the emphasis on gas delivery alone.

As matters now stand, deferment of men under 38 years of age is chiefly for the purpose of permitting the training of replacements. Those in the 38-45 age group, employed in essential industry, will in all probability be allowed to stay on the job. The army is not presently interested in men in the latter class for combat service, but the so-called work-or-fight orders are designed to steer them into some essential job under threat of military service.

# Profit or Loss?

## *Your Books Should Show You Where You Stand*

By LORNA LENNOX

Assistant Treasurer, Imperial Gas Company, Los Angeles

**T**O GAIN an adequate picture of what is actually happening in our business we find that a breakdown of equipment, sales, cost, depreciation, and overhead figures is essential. It is not enough to show a black figure on the Dec. 31 statement. The net profit figure obscures much that is good and much that is bad. In order to plan an intelligent course of action for the following year, we must break down this net profit figure. We must find out why we are making money in one territory or department and losing money in another.

We have about one hundred different territories throughout California, Arizona, and parts of Nevada in which we operate. We own the equipment in these territories and sell the gas at wholesale prices to our dealers. We have been making an yearly analysis of each dealership since 1934. At that time we employed the services of a certified public accountant to instruct us in



LORNA LENNOX

the proper procedure. Although we have applied this analysis only to dealers, the same method can be used to show profits or losses from the various departments of a business. The primary purpose is to show whether or not every unit of the business is standing on its own feet, able to carry its just portion of the general overhead of the business as well as its own specific expenses. Without some kind of cost analysis a business man is like a mariner without a map.

In breaking down our net profit figure, we use a columnar pad with

•

\* The keeping of records today is more important than ever before to LP-Gas dealers, for an adequate system of book-keeping will show where profit is being made and what activities are operated at a loss

At least, that is the purpose, and the accomplishment, of the Imperial Gas Co., Los Angeles, in the comprehensive set-up that has been developed out of years of experience. This system, while prepared by a distributor for his dealer organization, may be adapted easily by a dealer to his individual business. By keeping it on a monthly basis, it can be seen quickly what dealers (or consumers) are doing at all times and sudden drops or rises in volume can be checked for cause. But, the author warns, it is not for those who are afraid of work.

Incidentally, this article shows that there are women in our industry who have something vital to contribute to the general good.—Editor.

# COLUMN HEADS FOR LP-GAS ACCOUNTING SYSTEM

1 DATE	11 RENT RECEIVED	20 EQUIP. DEPRE- CIATION
2 AVERAGE PRICE PER LB.	12 TANK & EQUIP. SALES	21 GROSS PROFIT AFTER DEPREC.
3 VALUE CONSIGNED STOCK	13 MDSE. SALES	22 OVERHEAD ON GAS SALES
4 VALUE LEASED EQUIP.	14 TOTAL GROSS INCOME	23 OVERHEAD ON MDSE. SALES
5 LEASED ACCOUNTS SERVED	15 COST OF GAS SALES	24 OVERHEAD ON TANK & EQUIP. SALES
6 NEW LEASES	16 COST OF TANK & EQUIP. SALES	25 DIRECT TAXES PAID
7 LEASES CANCELLED	17 COST OF MDSE. SALES	26 GENERAL OVERHEAD
8 GAS POUNDS PURCHASED	18 TOTAL COST OF SALES	27 TOTAL OVERHEAD
9 GAS SALES VALUE	19 GROSS PROFIT ON SALES	28 NET PROFIT

It takes a standard ruled book 34 inches wide to accommodate the above 28 divisions of records which are maintained by the Imperial Gas Co. in its bookkeeping system to reveal at a glance the exact status of its own business and that of each of its many dealers. There is also an extra space for "Remarks." One full page is devoted to every account.

28 headings. We allot one sheet to each dealer. On this chart we set down the figures showing the equipment in his territory, both in his stock and in the hands of customers. We have columns for the number of accounts he is now serving, the number of new accounts he has taken on during the year, and the number of accounts lost. We show the number of gallons purchased from us for the year and their dollar value. We list merchandise sales and tank sales and include other income such as installation and upkeep charges. Then we show our cost of sales. By subtracting total costs from total sales, we arrive at the gross profit on sales for each dealer. The total depreciation is broken down according to the amount of equipment in each territory. The total overhead on gas, merchandise, and tank sales is then prorated among the dealers. Subtracting the depreciation and overhead from the gross profit, we arrive at the net profit for the year for the individual dealer.

#### **Analyses Are Often Surprising**

Often this profit figure is an amazing revelation. Frequently we find that our bigger accounts are not the ones which are the most profitable. It is easy to think that the agreeable fellow who is always such good company and with whom business relations are always so pleasant is a good account. However, after the proper depreciation and overhead have been apportioned to his territory, we find we may be selling to him at a net loss.

To stop after finding out whether or not we are making a profit in a

territory would be to waste much of the value of the analysis. The next step is to find out why certain conditions exist. In our business there are three principal factors in determining profit and loss: the amount of gas sold, the price at which it is sold, and the rate of turnover of the equipment. If any one of these factors is inordinately low, the account may show a loss.

#### **Checks Amount of Gas Used**

To find out whether the equipment in the hands of the dealers is being put to the best possible use, we make a supplemental chart showing the amount of equipment needed by each dealer to sell 100 lbs. of gas. We also make a closely related chart showing the average number of pounds purchased per month by each customer. The figures are already part of the analysis, ready for our use. If the average number of pounds purchased is very low, say only 25 lbs. per month, there is obviously something wrong in that territory. Perhaps a large percentage of the customers are seasonal users. Probably there are many dead accounts which should be weeded out.

There are two possible courses of action which suggest themselves as the result of this condition. We must build a bigger gas load by selling appliances. We must pick up excess equipment. Investigation may show that some customers have not used any gas for a number of months. In that case it is usually wise to take out the outfit. In other instances a smaller tank may be sufficient to take care of the consumer's needs. In this way a



The home office of Imperial Gas Co., Los Angeles. Those in the picture are, left to right: J. J. Burke, assistant to the president; Philip Kock, Jr., vice president; A. N. Kerr, president; Robt. G. Hardie, secretary, and Lorna Lennox, assistant treasurer.

large tank may be released for the use of a restaurant or brooder. In the case of seasonal users, it might be best to repossess during off-season or to establish a minimum which will justify leaving that equipment investment in the hands of the consumer.

#### Investment vs. Gas Sales

By this study of the relationship between investment and gas sales we are able to determine where to put additional equipment. Obviously, if the territory is operating at a loss it would be foolish to put more tanks and regulators into that area. However, if the returns of that area were still part of the total they might be so obscured by other factors that we would not be able to arrive at the correct policy. Since the supply of new tanks has been so severely curtailed because of the war, the proper use of avail-

able equipment has become particularly significant.

We have found that the statistics which comprise our cost analysis are used in a number of ways throughout the year by almost everyone in the office. The breakdown of sales is helpful in preparing government reports, computing tax figures, etc. We have our chart arranged so that monthly statistics for three years appear on one page. This makes it very easy to check a dealer's progress from year to year. By making comparisons among dealers it is possible to see what can be done and to establish standards of performance.

Scientific management depends upon accurate analyses as well as accurate accounting methods. Although the preparation of our chart takes many hours of work with pencil and adding machine, it is too valuable a guide to neglect in our business.



# Propane Speeds Cement Drying In Midwest Powder "Igloos"

**P**ROPANE is successfully maintaining constant heat rise of 75° inside "igloos," despite sudden drops in temperature to below zero. (No, the snow doesn't melt and run down the necks of Mr. and Mrs. Eskimo and the kids). These igloos are of concrete and after propane provides the heat to set the concrete, the igloos turn out to be large powder reservoirs. (And, you know what that means. It means LP-Gas has contributed again to the war effort!)

It now takes three days of constant heat to set the concrete in each igloo and propane is said to

By CRAIG ESPY

be doing a much better job at the task than coal, coke or oil, other "Beyond-The-Mains" fuels that have been tried out. One good reason for this is that propane provides controllable heat that requires no servicing, and no fueling from the inside. Where a service man has had to step inside the igloo to refuel other equipment there has been danger that he would be affected by carbon monoxide.

H. J. Porter, vice president and general manager of the Northeastern Oklahoma Liquefied Gas Co., of Tulsa, Okla., is responsible for the design and servicing of the installation described. The type of system in service is the above-ground batch propane vaporization system, which is standard with the company mentioned.

## Propane Leaves No Soot

The igloos are erected in batteries of three. Two hundred fifteen batteries, or 645 igloos, are being constructed in the current project. The diameter of each igloo is 50 ft. The height at the dome is 16 ft. The capacity is 23,000 cu. ft. No soot collects on walls, and no fumes form because of complete combustion of the fuel.

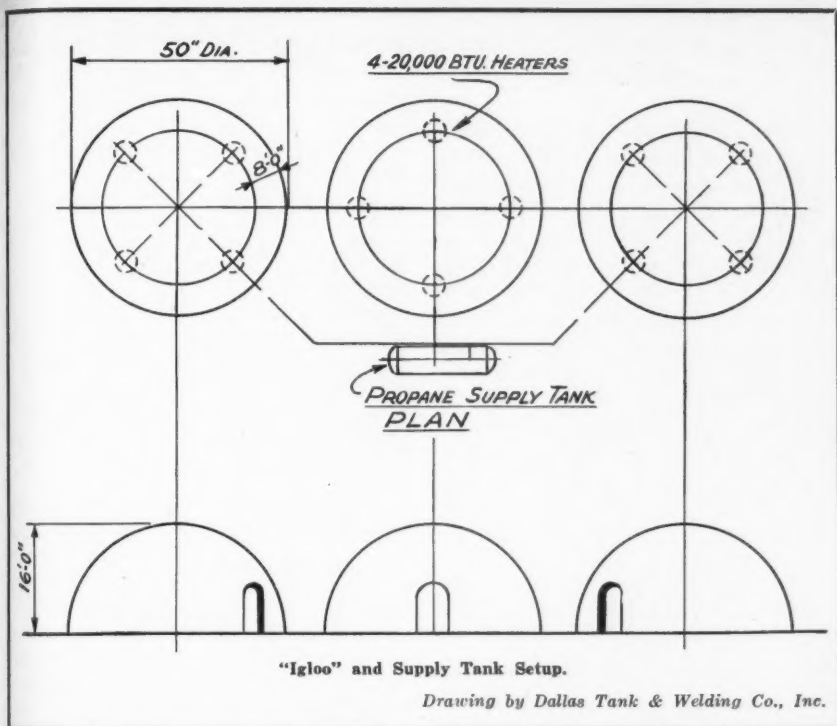
The accompanying sketch shows



H. J. Porter, vice president and manager of the Northeastern Oklahoma Liquefied Gas Co., Inc., of Tulsa.

BUTANE-PROPANE News





the layout of the installation. The heaters, four 20,000 Btu. Humphrey circulating unit heaters to each igloo, are set 8 ft. in from the inside wall, in the form of a cross. The storage tank is placed 25 ft. out from the center of the center igloo. Feed lines, each controlled by a valve, pass into the igloo. A master valve placed just below the tank regulator controls the flow in all lines.

The installation is engineered so it can be easily removed and set up again. While in service in one battery, a new battery is being made ready for pouring. When the three days of heating period have expired the unit is disassembled

and reassembled at the new location. Unions at each joint help to make it possible for one mechanic and two helpers to take down the unit and have it burning again in a new location in just three hours' time.

The heaters operate from a 215-gal. water capacity above-ground system. Each system carries a load of 240,000 Btu. per hour for a total of 72 hours. In the three weeks of operating prior to the writing of this article, two spells of sub-zero weather were encountered. One carried the temperature to 8° below zero and the other to 4° below. Mr. Porter reported that despite the heavy load and the ex-

cessive weather there was no decrease in efficiency during the period.

Tests have proved the possibility of maintaining a constant heat rise of 75° above outside temperatures. The fuel consumption per battery is 2.8 gal. per hour. The 215-gal. tank therefore accommodates nicely the load for the 72 hour period.

Northeastern Oklahoma Liquefied Gas Co. has also been awarded contracts to provide propane service to a barracks, dining hall and kitchen. The barracks is 225 x 25 ft. and is made up of nine rooms. The dining hall is 150 x 30 ft. The bath house is 75 x 20 ft. Heating, cooking and water heating services will be provided. This installation will be fueled from a 1280 gal. tank which had previously served the company at Tulsa as a bottling plant. To replace this storage tank, a 2250-gal. tank has been moved onto the premises.

In connection with recent contracts and at AA4 priority, the company has recently purchased from Dallas Tank & Welding Co., Inc., 10 215-gal., 200-lb. working pressure tanks. Northeastern has been in business since 1940 and is servicing approximately 200 domestic installations of the type it standardizes upon. These are installed on the lease basis.

### **Supply Men Will Entertain NGAA Convention Delegates**

At a meeting of the board of directors of the Natural Gasoline Supply Men's Association held Feb. 19 in Tulsa, Okla., it was decided that the customary cocktail hour and buffet dinner would be given to delegates to

the annual Natural Gasoline Association of America convention at the Baker hotel in Dallas, Texas, April 14-16.

Quoting from the minutes of the Supply Men's meeting, "There was a general discussion of the type of entertainment which should be offered at this time and it was agreed the relaxing good fellowship inherent in a cocktail hour and buffet dinner was just as necessary now as at any time. The scale of the entertainment might be somewhat reduced due to war restrictions but otherwise it was agreed a duplication of the highly successful stag evening presented in 1941 at the Baker should be planned for this year."

G. B. Lane was selected as chairman of the entertainment committee for the occasion.

President Ray E. Miller, of the NGAA, has stated that the discussions planned for the convention are in the national interest inasmuch as they are expected to aid the industry to correlate its efforts in the war program and thereby increase its effectiveness.

Secretary Wm. F. Lowe urges all who plan to attend to make room reservations at the Baker hotel in Dallas well in advance.

### **Plumbing and Heating Tank Order Is Interpreted**

Interpretation No. 1 of L-199, covering plumbing and heating tanks states that underfired storage water heaters containing tanks made of the metals specified may be installed if the heaters were assembled prior to Dec. 19.

The manufacture of such water heaters is covered by L-185 and that order does not prohibit the installation of heaters already assembled on Dec. 19, 1942.

# SAFETY RULES

**S**AFETY has always been stressed in the organization of the Atlantic States Gas Co., of New York and Pennsylvania, but it is being particularly emphasized during this war period, according to Col. George A. Burrell, president.



**GEO. A. BURRELL**

Company rules governing safe practice in servicing and installation of LP-Gas equipment has been printed and distributed to all employees. These were prepared by safety committees appointed by the men, themselves, in the three operating areas of Lancaster and Lewistown, Pa., and Cortland, N. Y. Chairmen and members of the committee are changed every few months so that more individuals may have a share in the work. Meetings are held twice every month, when causes of accidents are discussed. Minutes of these meetings are distributed to all districts so that all employees are made familiar with what their associates are doing.

As an evidence of the attitude of the Atlantic States Gas Co. toward the subject of safety, cash incentives are offered the men for their cooperation. All men are paid \$5 per month for attendance at the meetings. The area that goes one month without an accident of any

kind receives \$15 for the committee to use as it chooses; two months pays \$30 and three months \$50. This money is usually invested in some kind of entertainment for the entire organization in the area concerned.

Given below are the safety rules, prepared under the advice and guidance of the operating managers of the three areas, F. A. Coulter, J. E. Shaffer and J. E. Taylor, and with the help of the salesmanagers, H. B. Coyle, C. M. Coyle and S. K. Ross:

**Bulk Plant.** Be sure all tank guards are properly placed on tanks when loading or unloading tanks.

*Always have wooden plugs available in a handy place.*

When gaging tanks do not open vent all the way, just crack it.

Do not back trucks around without some one guiding you, or get out yourself and check your direction.

See that guards are properly placed and goggles worn when using grinding wheel.

Inspect motor vehicles for gasoline, oil, brakes, horn, tires, lights and see that each is in proper condition.

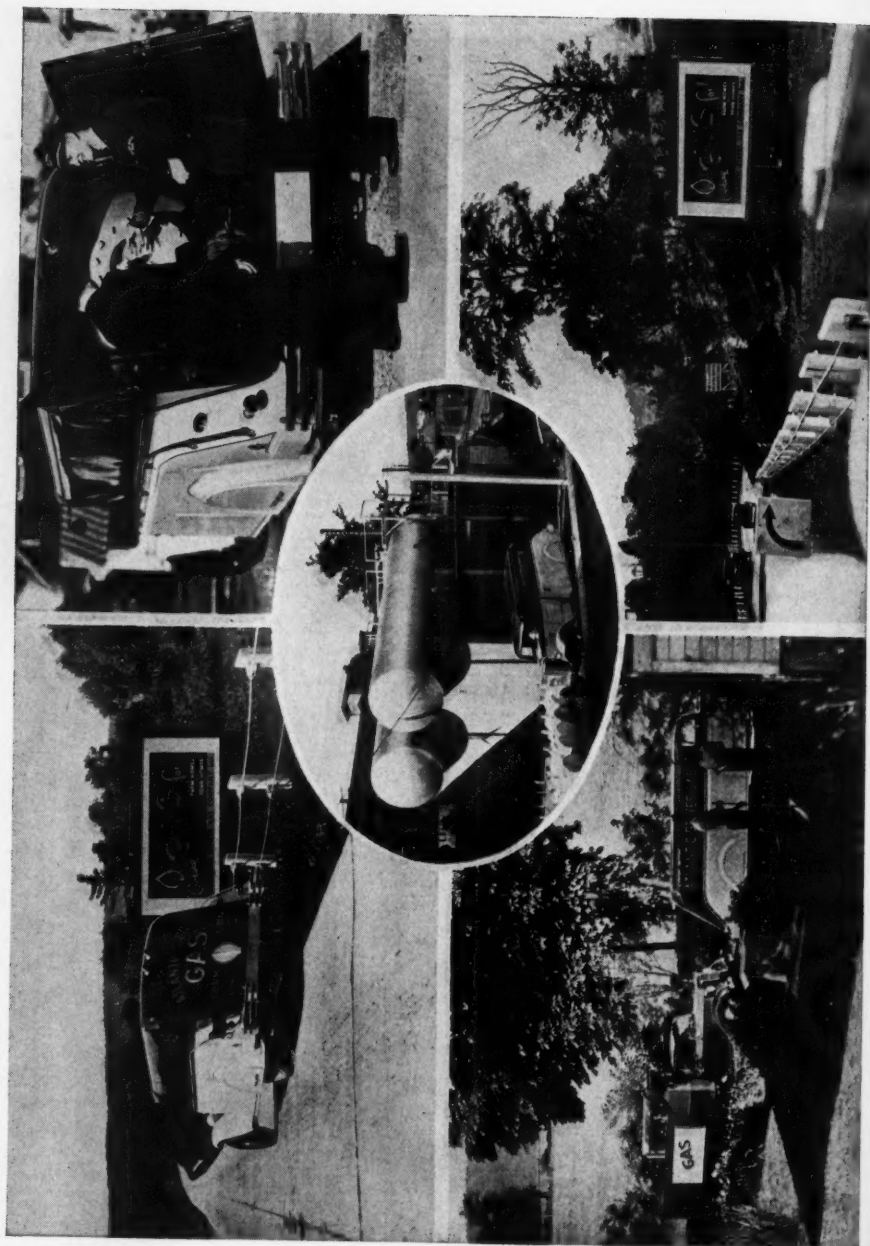
Check all fire extinguishers regularly, including those on the trucks.

Make sure all assemblies are in good shape before leaving the plant.

Keep plant clean and all material and merchandise neatly placed, and all hazards removed.

Customers' tanks, in the bulk plant yard, should be carefully inspected, new or old, and kept painted. They should rest on wooden supports.

Take pride in your motor equipment. It should be kept neat and



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clean, and painted as needed. This rolling stock on the highway advertises the company and its wares and should present a good appearance.

Keep automobiles away from storage tanks, tank cars and vaporizer house. They are a source of fire hazard. The obvious exception is a tank being filled. Its motor must be shut off.

Do not smoke in the vicinity of storage tanks, tank cars or vaporizer house.

Don't get liquid propane or butane on hands or clothes—it evaporates rapidly causing freezing. Treat similar to a burn, if necessary.

Test for leaks only with soapy water or linseed oil, never open flames.

Before starting repairs on an installation make sure that valves on both sides of section to be repaired are closed tightly, and that section of piping is purged of gas, in a safe manner. A good method is to connect an ordinary hose to a connection in the line and run it to the outside where bleed gases should be burned.

Do not enter a liquefied petroleum gas storage tank until it has been thoroughly purged, and all pipe lines, leading thereto have been *disconnected*; not merely closed off.

**Unloading Tank Cars.** Place "Tank Car Connected" sign in proper place before commencing unloading operations.

Be sure tank car, tank piping and

railroad siding are thoroughly grounded before starting to unload.

Do not place your head directly over the tank car gaging device after releasing the hold down latch—high pressure may force slip tube out rapidly.

Be careful when removing plugs or caps on connections to tank cars or manholes. Shutoff valves may be leaking or not closed tightly.

Be sure all unloading connections are tight.

Never tamper with relief valves on tank cars.

Never place your head or face over the relief valves.

Don't overload storage tank—observe readings on gaging dial or gage pole, and fill only to height corresponding to liquid temperature.

Bleed valves should be installed on unloading and equalizing hoses to relieve pressure in unloading hose and equalizing hose before disconnection. Caution—it is dangerous to break an Ever-Tite coupling under pressure.

**Installation Work.** Carefully examine the tank to make sure that paint has not been scraped off. If it has, repaint the part effected, and handle tank carefully so that no more paint will be knocked off. A small bare spot no larger than a pin hole will start corrosion of the tank. In filling the hole, first throw in some fine, loose dirt so that pebbles, rocks, or large pieces of dirt will not knock off the paint.

Five inches of sand should be placed in the bottom of the hole for the tank to rest on. If sour ground is suspected, a sufficient quantity of lime chips is to be placed in the bottom of the hole. If the ground is known to be bad, the tank is to be encased in concrete.

Always have at least two men to raise or lower customers' tanks with truck hoist. This applies when load-

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Opposite Page—Scene showing some of the activities of the Atlantic States Gas Co., Inc. Upper left: Delivery truck starting on regular daily trip. Upper right: Driver explaining construction of tank and delivery procedure. Center: One of the bulk plants of the company. Lower left: Preparing to make a residential installation. Lower right: Signboard tells the motorist of the fuel and the company.

ing truck and upon arrival at customers' premises.

Before taking a tank for installation make sure fittings are tight.

Put fittings guard on tank as a very first step in handling it, and never take it off until securely placed in final installation position.

Installation truck should not be backed in yard unless a second man—standing to one side of truck rear—guides driver. Otherwise there is possibility of backing into tanks, or destroying customer's property.

Make tank secure on truck by lashing guard to truck body and using wood blocks to prevent slipping from vertical position.

Locate house drains and do not bury tank near a drain.

Tank should be lowered into hole by crane with one man on each side to guide it.

Curb box must be lowered by two men, each holding opposite sides. Remember: This operation is the only one in which fittings (especially filler nipple) are not guarded against heavy

blow. The same is true when the curb box is removed.

*Wooden plugs are not only to be carried by everybody who visits a home, but are to be kept in a handy place so they can be easily obtained, and everybody on the crew must know exactly where they are. And, by all means, kept in a very handy place while the crews are working around tanks. Motorized equipment in a home must be examined by a crew before work starts so as to know if it is sparking. Also, adjoining premises must be examined to see if fires or lights exist there, and the water supply and buckets, and hose, located.*

Test for leaks only with soapy water or linseed oil, never open flames.

If, when making an installation, the job cannot be completed that day, be sure that hole is sufficiently covered with lumber, so that there is no danger of anybody falling into hole. Appliance crating will usually be available if nothing else is. Be sure customer's family is fully informed.



▲  
Equipment for making LP-Gas installations. The meter is a product of the American Meter Co.  
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Customers should be informed on how to turn meter off in case of a leak. They should also be instructed how to turn pilot off and to notify office. Tell them orally and also be sure that white card\* is attached to meter when it is installed, which gives instructions thereon. Bring customer's attention to this card.

Advise customer also how to check pilots in case he smells gas. Pilots which have been unintentionally blown out are frequent sources of "leak" calls.

**Service and Meter Reading Work.** Report to operating manager anything that you might come in contact with that is not working properly so that it may be repaired or adjusted before anything serious happens.

\* The white card of instructions for the customer reads as follows:

#### Atlantic States Gas Equipment

The gas equipment installed in these premises meets with the approval of the Underwriters' Laboratories, The National Board of Fire Underwriters, and all National and Local regulations in effect at the time of installation.

For the customers' information we offer the following suggestions for the operation of the equipment:

Appliances will only give maximum efficiency and satisfaction when kept clean and properly adjusted. Any representative of the gas company will instruct you in the care of your appliance.

Minor adjustments will be made by meter readers or other representatives doing their routine calls. For major service adjustments or complaints call the headquarters of the gas company at the address on reverse side. If, for any reason, it is necessary to turn off the gas supply the following steps should be taken:

1. Be sure that all gas valves on your appliances are turned to the "off" position.
2. Remove the long hexagonal cap on the right end of the valve to which this card is attached.
3. Using a wrench, turn the  $\frac{1}{4}$ " shaft clockwise until the valve is shut tight.
4. Replace the hexagonal seal cap.
5. When turning gas on again remember to light all pilot lights. If gas has been shut off for a long period, it may be necessary to "bleed" the lines of air before a full flow of gas will come through to the appliance burners.

In any case of emergency, call the Gas Company at the address on reverse side.

Meter readers should at all times use flash light in going down inside cellar steps to make sure that there is nothing on the steps that might cause a fall.

Before turning on gas be sure that all valves are closed and that there is no open line, then turn gas on and be sure appliances are adjusted properly before leaving.

If there should happen not to be anybody home where you went to turn on the gas, and you cannot gain entrance, do not turn on the gas until you are able to get inside of the house, so you can make sure everything is O.K.

In making contacts from day to day with our customers be on the lookout at all times for appliances that might have been added on to our lines, but not connected by a Company representative. There are times when these connections are not made according to Company specifications and may therefore be a hazard. Such conditions should be reported to the operating manager at once.

In servicing gas appliances be sure that safety shut off is working on all automatic appliances, particularly water heaters. These are quite often installed in the cellar and in time the safety shut off shaft gets sticky, and does not shut off properly, making it advisable to check them from time to time.

Always be sure that customer understands the proper way to use gas appliances, especially oven lighting and use of water heater, for the customer's safety, as well as the Company's safety. Customer should be instructed to notify the Company at once when system or appliances do not work in the way explained they should.

Upon completion of whatever service you may be doing, a complete check-up of all other appliances in



the customer's home, particularly those appliances that have automatic controls, must be made. The automatic controls must be checked, even if you are not servicing the appliances that have these controls, and a notation made on your customer service complaint so that we may mark our records in the office accordingly.

Check high and low pressure regulator vent lines to determine if the diaphragms leak gas.

Remedy any hazardous conditions that may exist in the installation that have occurred since the time installation was made.

**Filling of Tank Trucks.** Open all valves between pump and tank truck before starting pump.

Open return line and see that the line is going into the bulk tank from which you are filling truck, since if you return dry gas to another tank, the pressure may be 15 or 20 lbs. higher than the tank from which you are filling, in which case you will not

only be unable to fill your tank truck but also you put a severe strain on all hose and pipe connections.

Shut off truck motor before filling.

Stay near truck while filling in case a connection breaks while loading.

Don't put your head near filling line at truck while loading.

As soon as truck is loaded be sure all hose connections are disconnected immediately. There is always the chance that another driver or the watchman may get in on the opposite side of truck and back truck away unaware that the filling hose is still connected.

In disconnecting, close valve next to pump on your hose line first, as your valve at filling end of hose may have worked open without your knowledge.

Be sure the doors are closed in back of truck so that the hose cannot come out and drag on the ground.

**Filling Consumers Tanks.** Always block wheel if you stop on any grade at all.



Making a delivery to a home in a small town in New York State.

When taking slip tube cap off always keep your head away from top of curb box.

Do not let the slip tube fly up after getting cap off as it is possible to break off the stop on end of slip tube.

Keep face away when gaging tanks.

Determine before beginning to fill a tank if there are any openings in buildings near the tank you are filling that are open. If this condition is found, these openings should be closed before venting of tank to gage it.

See that all valves are open between pump and tank before starting pump.

Don't stretch your hose where you are barely able to reach the tank so that there is a pull on the nipple when you are pumping, since this may cause a leak at the nipple or even break it off.

Check packing nut on slip tube, but don't draw it too tight, especially in case of tank filled about once a year, because rust accumulates on the rod around the packing nut, making it very hard to get up at the next filling.

Check washer in filler valve and slip tube cap. Sometimes the washer in filler valve is rolled and in this case it is very hard to keep filler valve from leaking after filling tank. Always carry a supply of these washers.

When closing valve on end of hose after filling tank don't do it in a jerky motion. Put your other hand on the hose and steady it while you are turning the valve.

Check for leaks through vent on high pressure regulator.

See that check valve in filler valve seats properly.

Report all broken curb boxes and all cases where the curb box is higher than the ground and where the nipple is as high as the curb box. *Note:* In these cases and where curb box is in

driveway, Company must see to it that a heavy cement collar is cast flush with ground level on outside and graded upward so as to reset curb box cover safely above filler valve.

Seal curb box. Turn off motor after filling and check for leaks by ear as a final test.

Always pick up valve end of hose and carry it to trucks instead of pulling the whole length of the hose along the ground.

See that doors are closed before leaving for next customer.

When replacing filler valve cap be *certain* you tighten it. When replacing slip tube cap, pick up cap in one hand, wrench in the other, in order to make sure you do not forget to tighten cap.

**Safe Driving Rules.** Do not drive over 40\* miles per hour.

Maintain a safe driving area in front, back, and on both sides of your vehicle.

Keep tires inflated at proper pressure, and change them around as needed.

Forget who has the legal right-of-way and do the sensible thing by keeping out of the way.

Adjust your driving speed to conditions of road surface, general traffic conditions and visibility.

Assume that the other driver or pedestrian is deaf, dumb, blind and knows nothing of traffic laws.

Don't depend entirely upon your rear vision mirror.

When obliged to back, get out and walk back or around your truck to make certain there is nothing behind. Then back immediately, watching sharply.

In backing a large vehicle, get someone to guide you. Regardless of

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\* New national law permits speed to 35 miles per hour.

being guided, realize that the responsibility is still yours, for backing safely.

If necessary to go back some distance, stop part way, get out and check your safe progress. This is part of the job of backing safely.

Never back at an intersection in order to turn around, but drive down the street to a side street or driveway and turn around there, or, if only a short block, drive around it.

When backing over a sidewalk and into a street, stop at the sidewalk to make especially certain that there is no little child playing behind or close by. Stop again at the curb to make a last check on traffic before backing into the street.

If you have to back at a driveway, where possible, back into the driveway from the street so that you can drive out and not be obliged to back out into the street.

Never coast.

Do not "jerk" your truck along—this is "Cowboy" driving.

**Lifting Rules.** Keep the back as

nearly vertical as possible, lifting with the legs and not with the back.

Keep the feet close to the object, approximately 8 to 12 inches apart.

When lifting object from the floor, keep hips lower than shoulders.

Remember that there is a limit to the amount everyone can lift. Too much weight causes muscle strain.

**Appliances.** Install appliances at most suitable and most convenient place.

Do not locate near furnace where leaking gas might be ignited.

Be sure to level all appliances.

Check all appliances with soap suds. Last thing to do before leaving is give the system a manometer test.

Be sure all packing wires are removed from range.

Properly adjust and explain the following to customer—

**Ranges:**

Lighting the oven.

The action of the thermostat.

Lighting the top burner pilot.

Explaining that burners can be lighted with a match.

Cleaning top burners, oven bottom and oven racks.

**Water heaters:**

Proper lighting of water heaters and the necessary delay before turning on main burner.

Show the customer the drain valve on water heater.

Proper temperature setting of the thermostat.

Explain expense and loss caused by dripping or leaking faucets.

**Refrigerators:**

In installing a refrigerator, make sure there is adequate space for air circulation around the refrigerator.

Explain proper re-lighting of refrigerator.

Explain proper defrosting and the reason for keeping ice



Making excavation for underground storage tank on customer's premises.

cubes in the freezing compartment when defrosting.

**Radiantfires:**

Explain necessity of ventilating room in addition to posting instructions.

Show customer how to cut down flame on radiantfire.

Explain shutting off the service at the meter and the necessity of lighting the burner to consume the gas in the line before disconnecting any appliances, after the service has been shut off.

Ask customer not to tamper with controls on appliances.

Proper cleaning of enamel surfaces. Make sure customer understands that when enamel is hot it is not to be wiped off with wet cloth; to prevent chipping. Tell customer to use a dry cloth in wiping off fruit juices, milk spots and grease spots immediately when they get on the enamel surface, to prevent discoloration.

In washing burners explain to customer the necessity of shaking excess water out of the burner.

In excess spill-overs, liquid sometimes gets into the venturis. Show customer how to empty the water.

Call customer's attention to the storage compartments of the range and suggest that they be kept dry and clean.

◆ ◆  
**Gen. C. D. Young Will Assist  
Director Jos. B. Eastman, ODT**

Brigadier General Charles D. Young (U.S.A. inactive), formerly Assistant Director of the Office of Defense Transportation, has been appointed Deputy Director of that agency, Joseph B. Eastman, ODT Director, announced Jan. 21.

Mr. Eastman stated that General Young would act for him, in event of his absence, on all ODT matters requiring immediate attention.

## **Louis Abramson, Jr. Heads LPGA**

**L**OUIS Abramson, Jr., president of Petrolane Gas Corp., New Orleans, was elected president of the Liquefied Petroleum Gas Association at a recent meeting of the executive board, succeeding George W. Bach, of the Skelly Oil Co. Mr. Abramson was formerly president of the Louisiana Butane Dealers Association and has been prominent in the LP-Gas industry for many years.



**L. ABRAMSON**

Vice presidents elected to serve the association are D. D. Purrington, Standard Oil Co. of Calif., San Francisco, and H. K. Strickler, of Protane Corp., Erie, Pa. Miss Florence Jacob was reelected acting secretary.

◆ ◆  
**OPA Simplifies Pricing  
For Cooking, Heating Stoves**

Simplification of the procedure for setting ceiling prices at wholesale and retail on new models of domestic cooking and heating stoves was provided by the Office of Price Administration Feb. 11 with the establishment of a method by which OPA may set both wholesale and retail ceilings at the same time that it establishes the manufacturer's maximum price.

This provision is formally set out in Amendment No. 4 to Revised Price Regulation No. 64—Domestic and Heating Stoves—and became effective Feb. 16.

# THE BOTTLED GAS MANUAL

## Chapter 18

## Competitive Fuels

### —Coal—

**A**GES ago this old earth of ours was covered with luxurious growth. In many places gigantic trees such as the redwoods of California flourished. Then a tremendous cataclysm occurred. Huge forests were engulfed within the bosom of the earth. Today we enjoy the benefits of these prehistoric forests, burning their remains in the form of coal.

#### Nature Supplies Man's Needs

Not all coal was formed in this manner. Many of the peat bogs of today will be coal beds, but not all of them. Those which do become coal will pass progressively to lignite, then to sub-bituminous, bituminous, semi-bituminous, semi-anthracite and anthracite coal. In this manner Mother Nature displays her habit of providing man's needs as he makes demands upon her.

The United States contains 45% of the now known world's coal deposits. These beds are found in commercial quantities in 31 of our states. In its heyday the coal industry employed 625,000 men and was capitalized for about two and one-half billion dollars. Strikes and economic disturbances have dealt the industry many staggering blows which have permitted other fuels to infringe upon its markets,

but coal still remains the principle source of heat and power in the United States, and probably will for years to come.

#### Love of Luxury Enters Picture

How does the LP-Gas industry stack up along beside this giant, coal, and what are its chances of taking over any part of the market served by it? The almighty American dollar still "talks" and our desire for a luxurious existence free from physical and mental labor plays its insidious part. First we will consider our rival from the economic viewpoint, and then from its appeal along the line of comfort and convenience. Before we consider the economic angle we must know something of its make-up and how its chemical constituents are turned into our old friends, B.t.u.'s.

*The Chemical Composition of Coal.* Coals differ greatly in their chemical and heat content. Even those taken from adjacent mines will show great differences. The

- The Bottled Gas Manual series by C. C. Turner, started in the July, 1941, issue of BUTANE-PROPANE News and will continue to be published monthly in chapter form until completed. This series constitutes a valuable text book and field manual that should be invaluable to everyone in the liquefied petroleum gas industry.—Editor.

theory is that convulsions of the earth's crust subsequent to the original catclysm served to introduce foreign matter such as rock into virgin seams. These same disturbances also opened up subterranean passages through which streams of water coursed for countless ages and these waters have deposited the chemicals and other matter which they held in solution or suspension. The elements of time and pressure also affect the chemical composition of coal in that the greater both of these factors have been the farther the process of devolatilization has progressed. It is, therefore, impossible to classify a coal on the basis of its chemical content alone, and to illustrate this I give the examples in Table 1 of ultimate analyses made of samples of bituminous coal.

Note the wide variation in fixed carbon content; also, the sulphur variation and the difference in B.t.u. per lb.; yet, each one of these coals is classed as bituminous.

All coals contain the five elements mentioned above and in addition some other foreign matter. A general classification of them

is made upon the basis of the ratio of fixed carbon to volatile combustible matter as shown in Table 2.

In the first two of these examples we have two coals with exactly the same heat content, yet with different percentages of fixed carbon, volatile combustible matter and ratios which differ so widely that they throw the coals into two different classifications. In the second two examples we have two coals of very nearly the same heat content yet with radically different percentages of fixed carbon and volatile combustible matter and very widely separated ratios.

*The Variable Heat Content of Like Classifications.* Samples taken from 28 bituminous mines in 16 states showed heat contents of from 10,860 to 14,620 B.t.u. per lb. and no two mines showed identical analyses or heat contents. I make mention of this to bring home the fact that while the buying public purchases any one of the classifications of coal before mentioned and thinks that it knows what it is getting, probably there is no greater variation in heat value in any other fuel. We can go through our woodpile and sort

**TABLE 1. ANALYSIS OF VARIOUS SAMPLES OF COAL**

*Percentages of Content.*

<i>Source of Sample</i>	<i>Fixed Carbon</i>	<i>Hydro-gen</i>	<i>Nitro-gen</i>	<i>Oxy-gen</i>	<i>Sul-phur</i>	<i>B.t.u. per lb.</i>
Knox County, Ind . . . . .	62.3	5.5	1.0	17.1	3.2	11,540
Williamson County, Ill. . .	67.1	5.2	1.5	16.7	0.9	11,860
Lincoln County, Wyo. . . .	74.5	5.3	1.3	12.5	1.0	13,310
Huntington County, Ark..	78.7	4.4	1.6	4.4	1.9	13,700



out the oak from the maple and arrive at fairly accurate heat values, but let us dump two kinds of coal into one pile and the two are indistinguishable to any but the most experienced eye, and even that individual cannot tell you what the heat content of the two samples may be without enlisting the services of a chemist. Yes, even two shipments from the same mine will differ, and I have seen tests made of samples taken from opposite ends of a coal car that showed differences of as much as 2500 B.t.u. per lb.! This difference amounts to a mere *five million* B.t.u. in a ton of coal!

One can readily see from the foregoing that it is impossible for us to point to bituminous coal and say that it contains so many B.t.u. per lb., and this same thing holds good for all other classifications of coal. We can only establish approximate values in accordance with the law of averages, and this presents its difficulties. Witness the confusing conclusions of various authoritative sources, as set out in Table 4.

*The Heat Content of Coal.* That the classification of coal by the above method means very little to us in determining the heat content

is illustrated by reference to Table 3.

In order to meet the most optimistic claims of coal competition let us adopt the upper heat content of each fuel as a basis for future computations in this chapter. This gives us the following values:

	<i>B.t.u.'s per lb.</i>
Anthracite coal.....	14,800
Bituminous coal.....	16,000

In actual practice probably 2000 B.t.u. less for both kinds of coal would be much nearer the average.

*The Efficiency of Coal as a Fuel.* Here, as in the case of wood, we run into a number of variables which make possible a wide range of efficiencies. Then again, the application of coal to commercial and industrial uses presents a far different picture from that of its application to the American home. Where the load is continuous, coal can render an excellent account of itself, but when the load is intermittent, as in home cooking, or light, as in domestic water heating, gas can give it close competition and in many instances surpass it in economy. Here again our basis of comparison must be the known cost of coal operation as against what experience has taught

**TABLE 2. CLASSIFICATION OF COALS BY RATIOS**

<i>Classification of Coal</i>	<i>Ratio of Fixed Carbon to Volatile Combustible Matter.</i>
Bituminous .....	3 or less to 1
Semi-bituminous .....	Between 3 and 6 to 1
Semi-anthracite .....	Between 6 and 10 to 1
Anthracite .....	Over 10 to 1



TABLE 3. HEAT CONTENT AND RATIOS OF VARIOUS COALS

Source of Sample	Classification	Vola- Ratio Fixed Fixed tile Carbon to B.t.u. Car- Mat- Volatile Per bon ter Combustible			
		lb.	%	%	Matter
Jefferson County, Ala. .	Bituminous	14,620	68.4	24.4	2.8 to 1
Cambria County, Pa. ...	Semi-bituminous	14,620	73.7	17.0	4.3 to 1
Pulaski County, Va. ...	Semi-anthracite	10,960	62.2	9.4	6.6 to 1
Christian County, Ill. ..	Bituminous	10,860	39.3	37.0	1.06 to 1

us as to gas operating costs. Let us first consider domestic cooking. The average month is 30.416 days (365 divided by 12). The average coal hod contains 28.3 lbs. The smallest cooking job will require at least a hod of coal a day. This would amount to 860.7728 lbs. per month or .4303 tons. If we have a job where we can equal the performance of .4303 tons of coal with 40 lbs. of propane through a 60% efficient gas appliance then the actual number of heat units required to do the job is 60% of 865,320 B.t.u. or 519,192 B.t.u. If we take 14,800 B.t.u. as being the heat content of 1 lb. of coal, the heat content of a ton would be  $2000 \times 14,800 = 29,600,000$  B.t.u., and .4303 tons would contain  $296,000,000 \times .4303 = 12,736,880$  B.t.u. The over-all efficiency would be 519,192 divided by 12,736,880, or 4.7%! This is not an unusual case example for domestic cooking and the per cent of efficiency is 77/100ths of 1% less than that cited for a similar example in Chapter 17 on wood.

If we add on another 40 lbs. of propane at 70% efficiency for the water heating job without increas-

ing the quantity of coal used, the consumption of propane for water heating alone would be 70% of 865,320 B.t.u., or 605,724 B.t.u. and the combined effective B.t.u. for cooking and water heating would be 519,192 plus 605,724 = 1,124,916 B.t.u., and the over-all efficiency of coal for both purposes would be 1,124,916 divided by 12,736,880 or but 8.8%.

If we allow an efficiency of 5% for domestic cooking, and 10% for cooking and water heating through the domestic cook stove we are being charitable, and with a 60% efficient gas cooking appliance we can duplicate domestic coal cookery on a basis of 17.53 lbs. of coal to 1 lb. of propane. The combined domestic coal cookery and water heating job through the medium of the kitchen range can be duplicated by a 60% efficient propane cooking appliance and a 70% efficient propane water heater on the basis of 9.5 lbs. of coal to 1 lb. of propane. Mark, however, that this is on the assumption that the propane consumption will be 40 lbs. for cooking and 40 lbs. for water heating as against .4303 tons of coal consumed, and that

# Dinner at Midnight

**J**OHN'S on the swing shift. Comes home about 12:30 at night, simply ravenous. Our hours are all topsy-turvy now, but *my* job is to keep him well-fed and fit to carry on with *his* job. If he works overtime and comes home late, I have to cope with that, too.

So my Grand range has been a blessing. I plan oven-meals, and that Robertshaw oven heat control helps me to time our meals to a split second, or to keep the food warm until he gets home. It helps us save gas too, an important economy when we're trying to buy more War



Bonds. When the war's over and we're ready for a new range, I'm going right back for another Grand.

WHEN PEACE COMES...IT WILL BE GRAND





# *Grand* GAS AND ELECTRIC *Ranges*

DIVISION OF THE CLEVELAND COOPERATIVE STOVE COMPANY  
CLEVELAND, OHIO

the consumption of propane may drop below these figures, whereas the consumption of coal cannot very well be less than .4303 tons per month. The ratio is apt to be even more favorable to propane than the values which we have taken above. In Table 5 we have some interesting information as to break-even prices for both fuels, based upon these figures.

*The "Hod-A-Day" Water Heater.* When we come to the matter of domestic water heating through the medium of the so-called "hod-a-day" coal water heater, we have an entirely different job upon our hands, but one in which we can also be competitive. We are fortunate in having at hand some very authentic information developed by Massachusetts Institute of

Technology which places the efficiency of this unit at approximately 14.5% on 13,700 B.t.u. bituminous coal.\* An admittance from Bulletin No. 20 of the Anthracite Institute states, "A fairly constant quantity of coal (17 lbs. per day) is required under all conditions of output," and also tells us of three tests in which the average fuel consumption for the load drawing period was 8.4 lbs. and during the "stand-by" period 8.5 lbs. The inflexibility of the hod-a-day water heater is thereby admitted by this coal organization, and we are told that it costs more to operate this type of heater during periods when it is not needed than in those

\* The results of these investigations were published by the American Gas Association in its "Final Report of Comparative Water Heater Tests."

**TABLE 4. AVERAGE GROSS HEAT CONTENT OF VARIOUS COALS  
ACCORDING TO DIFFERENT AUTHORITIES**

Coal Classification	Carr & Selheimer			
	Kent's Mechanical Handbook	"Fuels and Their Utilization"	Motor- Stoker Handbook	C. W. Merriam, Jr. "Household Gas Water Heating"
Anthracite . . . . .	14,600 to 14,800	14,400	12,500*B	11,500 to 14,500
Semi-anthracite . . .	14,700 to 15,500	14,800		
Semi-bituminous ..	14,700 to 16,000	15,400		
Eastern bituminous	14,800 to 15,500	15,200	14,000	14,000*C
Western bituminous	13,500 to 14,800	13,500*A		11,500*D

\*A—Listed as sub-bituminous.

\*B—Listed as stoker coal.

\*C—Listed as bituminous, upper limit.

\*D—Listed as bituminous, lower limit.

hours when there is a demand upon it! Compare this direct loss of over 50% of the fuel consumed to the small standby loss of the automatic gas-fired water heater with its tiny pilot flame in operation during such periods.

I have seen many of these "hod-a-day" water heaters in domestic operation, and I have yet to find one that did not use more than 17 lbs. of coal per day. In fact, the average on all observed cases has

been  $\frac{1}{2}$  ton per month, and this consumption has been surprisingly constant regardless of the demands made upon it by the family. Water temperatures have been excessively high, which constitutes a direct thermal waste and has its damaging effect upon the water heating system.

If from the foregoing we are charitable and allow the "hod-a-day" water heater an efficiency of 15% on 14,800 B.t.u. anthracite

**TABLE 5.—BREAK-EVEN PRICE OF PROPANE IN CENTS PER POUND ON BASIS OF MINIMUM COAL CONSUMPTION OF 0.4303 TONS OF 14,800 B.t.u. FUEL PER MONTH IN A KITCHEN COAL RANGE USED FOR DOMESTIC COOKING EXCLUSIVELY OR DOMESTIC COOKING AND WATER HEATING EXCLUSIVELY**

0.4303 Price Of Coal Per Ton		Tons Of Coal Would		Consumption of Propane in Pounds Per Month																	
		15	20	25	30	35	40	45	50	60	70	80	90	100							
<i>in \$</i>	<i>Cost</i>	<i>Cents Per Pound at Which Propane Could Sell on Break-Even Basis</i>																			
16.00	6.88	45.8	34.4	27.5	22.9	19.6	17.2	15.2	13.7	11.4	9.8	8.6	7.6	6.8							
15.50	6.67	44.4	33.3	26.6	22.2	19.0	16.6	14.7	13.3	11.1	9.5	8.3	7.3	6.6							
15.00	6.45	43.0	32.2	25.8	21.5	18.4	16.1	14.3	12.9	10.7	9.2	8.0	7.1	6.4							
14.50	6.24	41.6	31.2	24.9	20.8	17.8	15.6	13.8	12.4	10.4	8.9	7.8	6.9	6.2							
14.00	6.02	40.1	31.0	24.0	20.0	17.2	15.5	13.3	12.0	10.0	8.6	7.7	6.6	6.0							
13.50	5.81	38.7	29.0	23.2	19.3	16.6	14.5	12.6	11.6	9.6	8.3	7.2	6.3	5.8							
13.00	5.59	37.2	27.9	22.3	18.6	15.6	13.9	12.4	11.1	9.3	7.8	6.9	6.2	5.5							
12.50	5.38	35.8	26.9	21.5	17.9	15.3	13.4	11.7	10.7	8.9	7.6	6.7	5.8	5.3							
12.00	5.16	34.4	25.8	20.6	17.2	14.7	12.9	11.4	10.3	8.6	7.3	6.4	5.7	5.1							
11.50	4.95	33.0	24.7	19.8	16.5	14.1	12.3	11.0	9.9	8.2	7.0	6.1	5.5	4.9							
11.00	4.73	31.6	23.6	18.9	15.8	13.5	11.8	10.5	9.4	7.9	6.7	5.9	5.2	4.7							
10.50	4.52	30.1	22.6	18.0	15.0	12.9	11.3	10.0	9.0	7.5	6.4	5.6	5.0	4.5							
10.00	4.30	28.6	21.5	17.2	14.3	12.2	10.7	9.5	8.6	7.1	6.1	5.3	4.7	4.3							
9.50	4.09	27.2	20.4	16.3	13.6	11.5	10.2	9.0	8.1	6.8	5.7	5.1	4.5	4.0							
9.00	3.87	25.8	19.3	15.4	12.9	11.0	9.6	8.6	7.7	6.4	5.5	4.8	4.3	3.8							
8.50	3.66	24.4	18.3	14.6	12.2	10.4	9.1	8.1	7.3	6.1	5.2	4.5	4.0	3.6							
8.00	3.44	22.9	17.2	13.7	11.4	9.8	8.6	7.6	6.8	5.7	4.9	4.3	3.8	3.4							
7.50	3.23	21.5	16.1	12.9	10.7	9.2	8.0	7.1	6.4	5.3	4.6	4.0	3.5	3.2							
7.00	3.01	20.0	15.0	12.0	10.0	8.6	7.5	6.6	6.0	5.0	4.3	3.7	3.3	3.0							
6.50	2.80	18.6	14.0	11.2	9.3	8.0	7.0	6.2	5.6	4.6	4.0	3.5	3.1	2.8							
6.00	2.58	17.2	12.9	10.3	8.6	7.3	6.4	5.7	5.1	4.3	3.6	3.2	2.8	2.5							
5.50	2.37	15.8	11.8	9.4	7.9	6.7	5.9	5.2	4.7	3.9	3.3	2.9	2.6	2.3							
5.00	2.15	14.3	10.7	8.6	7.1	6.1	5.3	4.7	4.3	3.5	3.0	2.6	2.3	2.1							
4.50	1.94	12.9	9.7	7.7	6.4	5.5	4.8	4.3	3.8	3.2	2.7	2.4	2.1	1.9							
4.00	1.72	11.4	8.6	6.8	5.7	4.9	4.3	3.8	3.4	2.8	2.4	2.1	1.9	1.7							
3.50	1.51	10.0	7.5	6.0	5.0	4.3	3.7	3.3	3.0	2.5	2.1	1.8	1.6	1.5							
3.00	1.29	8.6	6.4	5.1	4.3	3.6	3.2	2.8	2.5	2.1	1.8	1.6	1.4	1.2							
2.50	1.08	7.2	5.4	4.3	3.6	3.0	2.7	2.4	2.1	1.8	1.5	1.3	1.2	1.0							
2.00	.86	5.6	4.3	3.4	2.8	2.4	2.1	1.9	1.7	1.4	1.2	1.0	.9	.8							
1.50	.65	4.3	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.0	.9	.8	.7	.6							
1.00	.43	2.8	2.1	1.7	1.4	1.2	1.0	.9	.8	.7	.6	.5	.4	.4							

Note:—Because of limited space computations have been carried out one decimal point only. The significance of the letter "P" before a decimal is that the decimal if carried out would be greater than the succeeding decimal in the same amount in the same line.

# Housing Projects DEPEND ON REGO

Here are shown several of the underground tanks which the Rego Gas Tank & Welding Company supplies to National Fuel Gas Company in eleven huge carloads. The tanks range from 215 to 1000 gallons capacity and all are designed for essential war services in Government Housing Program.

Rego equipment is used extensively on these tanks. It is a saving example which shows how Rego serves best and economically in installations devoted to our war work. Alert dealers can help installation by showing where LP Gas can be a help and in meeting today's most urgent demands.

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insure perfect performance and economy by insisting on genuine  
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Engineers in equipment for using and controlling high pressure gases.



coal we are at least being fair to this type of water heating unit, and but 2220 B.t.u. per lb. of coal are effective. In comparison to a 70% efficient automatic propane gas-fired water heater, 6.82 lbs. of coal would be required per lb. of propane to do the same job.

There will be those in the propane industry who will be aghast at any such figures, but wait a minute, for the whole story hasn't been told. I have said that I have never yet seen one of these "hod-a-day" water heaters operate on less than  $\frac{1}{2}$  ton of coal per month, and the coal industry itself says that this unit requires as much fuel when it is at "standby" as it does when on "demand" load. If 6.82 lbs. of coal to 1 lb. of propane is a fair ratio, and the "hod-a-day" water heater uses 1000 lbs. of coal per month, then the efficiency of the "hod-a-day" unit cannot be anywhere near 15% until the demand load gets up to 1000 divided by 6.82, or 146.6 lbs. of propane per month, and there are precious few domestic water heating jobs that require this amount of fuel. Let's study Table 6 carefully. We will find that the majority of domestic water heating jobs can be competitively handled at a saving with propane because of the inflexibility of coal in the "hod-a-day" water heater.

*Coal vs. Propane in Space Heating.* Let us turn back to Chapter 17, wherein we found it expedient to mention certain efficiencies claimed for coal. You will recall that some stoker manufacturers claim efficiencies of as high as 70%

with 50% mentioned as a good efficiency for hand-firing and 60% excellent for hand-firing. Our task of competing with such efficiencies would appear to be hopeless, but here again we may be interestingly competitive by taking advantage of coal's inflexibility under certain conditions. Let us mention a particular example. I have just returned from the office of one of my friends. The thermometer outside is hovering around zero, yet at midnight that office was an uncomfortable 80. Under ordinary conditions his office is used but eight hours a day for five days a week, yet for 24 hours each day, seven days a week, it is heated uncomfortably warm. Why 24 hours a day, seven days a week? It is because the building owners find it fully as cheap to maintain heat 24 hours a day as to provide heat only when it is needed, thanks to the inflexibility of coal and the excessive fuel consumption during periods of building a new fire.

Let us make a hasty comparison of two such examples with the possibility of doing the same job by propane.

*Example One.* Consumption 24 lbs. of 12,500 B.t.u. stoker coal per day. Office used eight hours per day, stoker efficiency 70%.

If 24 lbs. of 12,500 B.t.u. coal are burned in 24 hours, the input is 300,000 B.t.u. per day, but as the stoker is but 70% efficient only 70% of 300,000, or 210,000 B.t.u. go into heating. As heat is needed only for eight hours, then  $\frac{8}{24}$  of 210,000 B.t.u. would be all that would be necessary for the job, or 70,000 B.t.u. If we used an unvented propane heater the entire 21,633 B.t.u. in each pound of propane

would go into heating the room; therefore, but 70,000 divided by 21,633 or 3.23 lbs. of propane would be required to give satisfactory heat during the eight hours that it was needed, and 1 lb. of propane would do the work of 7.43 lbs. of coal. In other words, under such conditions propane could cost 7.43 times as much as coal per pound and still be competitive.

*Example Two.* Consumption 24 lbs. of 14,800 B.t.u. anthracite coal per day. Office used eight hours per day; hand-firing efficiency 50%.

If 24 lbs. of 14,800 B.t.u. coal are

burned in 24 hours, the input is 355,200 B.t.u. per day, but as the hand-firing is but 50% efficient, only 50% of 350,000 or 175,000 B.t.u. go into heating. As heat is needed only for eight hours, then 8/24 of 175,000 B.t.u. or 58,333, would be all that would be necessary for the job. If we used an unvented propane heater the entire 21,633 B.t.u. in each pound of propane would go into heating the room; therefore, but 58,333 divided by 21,633 or 2.69 lbs. of propane would be required to give satisfactory heating during the eight hours that it

**TABLE 6.—BREAK-EVEN PRICE OF PROPANE IN CENTS PER POUND ON BASIS OF MINIMUM COAL CONSUMPTION OF 1000 LBS. PER MOTH OF 14,800 B.t.u. FUEL IN A "HOD-A-DAY" WATER HEATER AS AGAINST VARIOUS QUANTITIES OF PROPANE USED.**

Price of Coal Per Ton \$	1000 Lbs. Of Coal Would Cost \$	Consumption of Propane in Pounds Per Month													
		30	40	50	60	70	80	90	100	110	120	130	140		
		Cents Per Pound at Which Propane Could Sell on Break-Even Basis													
16.00	8.00	26.6	20.0	16.0	13.3	11.4	10.0	8.8	8.0	7.2	6.6	6.1	5.7		
15.50	7.75	25.8	19.3	15.5	12.9	11.0	9.6	8.6	7.7	7.0	6.4	5.9	5.5		
15.00	7.50	25.0	18.7	15.0	12.5	10.7	9.3	8.3	7.5	6.8	6.2	5.7	5.3		
14.50	7.25	24.1	18.1	14.5	12.0	10.3	9.0	8.0	7.2	6.5	6.0	5.5	5.1		
14.00	7.00	23.3	17.5	14.0	11.6	10.0	8.7	7.7	7.0	6.3	5.8	5.3	5.0		
13.50	6.75	22.5	16.8	13.5	11.2	9.6	8.4	7.5	6.7	6.1	5.6	5.1	4.8		
13.00	6.50	21.6	16.2	13.0	10.6	9.2	8.1	7.2	6.5	5.9	5.3	5.0	4.6		
12.50	6.25	20.8	15.6	12.5	10.4	8.9	7.8	6.9	6.2	5.6	5.2	4.8	4.4		
12.00	6.00	20.0	15.0	12.0	10.0	8.5	7.5	6.6	6.0	5.4	5.0	4.6	4.2		
11.50	5.75	19.1	14.3	11.5	9.5	8.2	7.1	6.3	5.7	5.2	4.7	4.4	4.1		
11.00	5.50	18.3	13.7	11.0	9.1	7.8	6.8	6.1	5.5	5.0	4.5	4.2	3.9		
10.50	5.25	17.5	13.1	10.5	8.7	7.5	6.5	5.8	5.2	4.7	4.3	4.0	3.7		
10.00	5.00	16.6	12.5	10.0	8.3	7.1	6.2	5.5	5.0	4.5	4.1	3.8	3.5		
9.50	4.75	15.8	11.8	9.5	7.9	6.7	5.9	5.2	4.7	4.3	3.9	3.6	3.3		
9.00	4.50	15.0	11.2	9.0	7.5	6.4	5.6	5.0	4.5	4.0	3.7	3.4	3.2		
8.50	4.25	14.3	10.9	8.9	7.3	6.2	5.4	4.8	4.3	3.9	3.6	3.3	3.0		
8.00	4.00	13.3	10.0	8.0	6.6	5.7	5.0	4.4	4.0	3.6	3.3	3.0	2.8		
7.50	3.75	12.5	9.3	7.5	6.2	5.3	4.6	4.1	3.7	3.4	3.1	2.8	2.6		
7.00	3.50	11.6	8.7	7.0	5.8	5.0	4.3	3.8	3.5	3.1	2.9	2.6	2.5		
6.50	3.25	10.8	8.1	6.5	5.4	4.5	4.0	3.6	3.2	2.9	2.7	2.4	2.2		
6.00	3.00	10.0	7.5	6.0	5.0	4.2	3.7	3.3	3.0	2.7	2.5	2.3	2.1		
5.50	2.75	9.1	6.8	5.5	4.5	3.9	3.4	3.0	2.7	2.5	2.2	2.1	1.9		
5.00	2.50	8.3	6.2	5.0	4.1	3.5	3.1	2.7	2.5	2.2	2.0	1.9	1.7		
4.50	2.25	7.5	5.6	4.5	3.7	3.2	2.8	2.5	2.2	2.0	1.8	1.7	1.6		
4.00	2.00	6.6	5.0	4.0	3.3	2.8	2.5	2.2	2.0	1.8	1.6	1.5	1.4		
3.50	1.75	5.8	4.3	3.5	2.9	2.5	2.1	1.9	1.7	1.5	1.4	1.3	1.2		
3.00	1.50	5.0	3.7	3.0	2.5	2.1	1.8	1.6	1.5	1.3	1.2	1.1	1.0		
2.50	1.25	4.1	3.1	2.5	2.0	1.7	1.5	1.3	1.2	1.1	1.0	.9	.8		
2.00	1.00	3.3	2.5	2.0	1.6	1.4	1.2	1.1	1.0	.9	.8	.7	.6		
1.50	.75	2.5	1.8	1.5	1.2	1.0	.9	.8	.7	.6	.6	.5	.5		
1.00	.50	1.6	1.2	1.0	.8	.7	.6	.5	.5	.4	.4	.4	.3		

Note:—The above compilations are on the basis of 146.6 lbs. of 21,633 B.t.u. propane at 70% efficiency being equivalent to 1000 lbs. of 14,800 B.t.u. coal at 15% efficiency.

Because of limited space computations have been carried out one decimal point only.

The significance of the letter "P" before a decimal is that the decimal, if carried out, would be greater than the succeeding decimal in the same amount upon the same line.

was needed, and 1 lb. of propane would do the work of 8.92 lbs. of coal. In other words, under such conditions propane could cost 8.92 times as much as coal per pound and still be competitive.

The foregoing examples should impress upon us three very important facts.

1. We cannot as a rule compete with coal on space heating on a parity in B.t.u. costs.

2. Successful competition depends upon:

- A. Proper engineering of the job.
- B. Proper design and efficiency of the appliances.
- C. The use of automatic temperature and time controls.
- D. Special propane space heating rates.

3. The conditions of operation will have to be either:

- A. Intermittent operation of the gas heater doing the same job.
- B. Less input by the gas heater accomplishing the same task.

In other words, we can't be "guessers" but must be engineers, taking pride in our ability to make a lesser amount of energy do a better job.

*The Merits of Coal as a Fuel.* These are strikingly similar to those of wood as a fuel:

- 1. The large number of heat units that can be bought for a cent.
- 2. It does not require as frequent attention as wood.
- 3. It can be burned in low cost appliances.
- 4. It can be stored in almost any place where it can be kept dry.

As in the case of wood, the principle reason for its use in preference to other fuels is a financial

one, and when oil, gas or electricity can meet this condition there isn't much resistance to changing fuels. Furthermore, people in rural districts don't own their own coal mines and offer this excuse for its use as is the case with wood.

*The Disadvantages of Coal as a Fuel.* These are legion in number, so we will but list the principle ones:

- 1. The inefficient application of the number of B.t.u. bought for a cent.
- 2. The skill and knowledge required to run a coal fire efficiently.
- 3. It is not a uniform fuel.
- 4. Cooking results and accurate temperatures are uncertain.
- 5. Appliances deteriorate rapidly because of intense heat and corrosive action of gases.
- 6. Dirt, dust, and mess.
- 7. Large chimneys and drafts required.
- 8. Stove pipes, linings and grates require frequent replacement.
- 9. Sulphuric acid from combustion gases particularly destructive of mortar and frequent "pointing up" of chimney required.
- 10. The labor involved in handling fuel and ashes.
- 11. The cost of ash removal.
- 12. Frequent attention to fire required.
- 13. Impossibility of leaving properties heated by coal for any great period in the winter time.
- 14. Storage space required.
- 15. Difficult and heavy for a woman to handle.
- 16. Flues require frequent cleaning.
- 17. Variable temperatures with their effect on health.

18. The danger of asphyxiation from coal gas.

19. The danger of fire from live coals.

20. The danger of fire from overheated flue pipes.

21. The danger of fire and explosion from coal gas.

Don't let anyone "kid" you that coal fires never explode. I was seated in my office at Albany, N. Y., one night when a terrific flue gas explosion blew the heavy heating plant to pieces, started a fire, and broke every light of glass in the building. The furnace door, weighing about 100 lbs. was blown through the roof!

*Getting the Facts as to Cost of Coal Fire Operation.* The coal burning customer does not tell you the entire truth when he tells you that it costs him so many dollars to heat with coal each year. He may tell you what the coal costs delivered upon his property, but he doesn't tell you about the incidents. Perhaps he doesn't think that they amount to much, but here are just a few of them:

1. Cost of cleaning flues frequently.

2. Cost of replacement flue pipes at least once every three years.

3. Cost of pointing up chimney at least once every five years.

4. Cost of ash removal.

5. Cost of ash buckets, shovels, cleaning brushes, etc.

6. Cost of replacement grates and linings.

7. Excessive depreciation of appliances.

8. Cost of papering and painting house more frequently.

9. Cost of cleaning house and its contents more frequently.

10. Value of time spent in serving and tending fires.

11. Value of business and appointments missed because of playing "nursemaid" to coal fires.

12. Value of clothes and furnishings ruined by coal dust and ash.

13. Health and disposition intangibles.

Be sure that he includes all of these items in his figuring of coal operating costs. A fair appraisal of these items will add at least three dollars per ton to his cost of coal operation.

What have we learned this evening in regard to this giant, coal?

We have learned that when it is used merely as a domestic cooking fuel we can lick it to a standstill. We have found out that when the kitchen range is used for cooking and domestic water heating we can give it a run for the money. We now know that a "hod-a-day" water heater is no competition at all on a domestic water heating job, and we have had the way pointed to us where we can take a lot of space heating jobs at distinct savings to the customers. We'll have much more to say on this in our session devoted to space heating. In the meantime, let's go out after some of this business now going to Old King Coal!

Now, for the questions on Chapter 18. Then check with the correct answers on Page 66.

•

### Questions on Chapter 19

1. What are the five principle elements in coal?

2. What acid can be formed by the proper grouping of three of these elements?
3. Upon what basis are coals generally classified?
4. What class of coal, anthracite or bituminous, generally has the greatest heat content?
5. To what do you attribute this?
- 6A. What is a fair percentage of efficiency for coal when it is used strictly as a domestic cooking fuel?
- B. Upon what basis would you compare coal with propane for domestic cooking?
- 7A. What is a fair percentage for the efficiency of coal when the kitchen stove is used for both cooking and water heating?
- B. Upon what basis would you compare coal with propane under these conditions?
- 8A. What is a fair percentage for the efficiency of coal when it is used in a "hod-a-day" water heater for domestic water heating only?
- B. Upon what basis would you compare coal with propane for this purpose?
9. Under what conditions can propane successfully compete with coal in space heating?
10. What particular characteristic of coal permits us to compete successfully with it even though more heat units can be bought for a cent in coal than in propane?

## Bureau of Mines Issues Bulletins on Fuel Saving

Two information circulars have recently been issued by the U. S. Bureau of Mines advising how to conserve fuel for household heating, I. C. 7220, "Home Insulation With Mineral Products—Conservation of Fuel for War." dated Sept., 1942, and I. C. 7229, "How to Save Fuel at Home," dated Nov., 1942.

Both of these circulars can be obtained free by writing to the Bureau of Mines, Department of Interior, Washington, D. C. The former goes into some detail of types, application and performance of house insulating materials; and the latter reviews maintenance of heating equipment, relative efficiencies of various fuels, various ways in which heat losses occur from buildings, and percentage savings in fuel resulting from various degrees of completeness of insulation.

Table of over-all efficiencies follows:

**OVER-ALL EFFICIENCIES**  
(Solid fuels listed are hand-fired)

	High	Low
Anthracite .....	70	50
Bituminous	65	40
Sub-bituminous }		
Lignite .....	53	40
Coke .....	70	50
Oil .....	75	50
Gas .....	80	55

## Mark Anton, Suburban Gas Co., Is Chief of District 1, PAW

Mark Anton, general manager of Suburban Gas Co., Livingston, N. J. was recently appointed Chief of District 1, for the Petroleum Administration for War. His offices are in New York City. District 1 covers the Eastern seaboard.

This information is provided by S. J. McLagan, who is operating manager for the Suburban Gas Co.



**MISS THIS  
OPPORTUNITY?  
NOT  
ME!**



**"L-P Gas Dealers,** like you and I, have a big chance to help in the war effort by making sure that our customers' appliances are in good working order.

"And we'll be helping ourselves, too. By keeping customers well satisfied with our service and their present equipment, they're going to be our best prospects when peace comes.

"Keeping customers enthusiastic about their L-P gas appliances isn't hard in most cases. Whenever I deliver gas, I take the opportunity to discuss their equipment. Most of the time everything is okay, but the fact that I keep in touch with them creates goodwill."

**"SATISFIED CUSTOMERS TODAY . . . MEAN  
MORE PROSPECTS TOMORROW"**



**FREE L-P REFRIGERATOR  
SERVICE MANUAL**—Write  
today for your free copy to  
Servel, Inc., Evansville, Ind.

**SERVEL,**  
*Incorporated*

**PEACETIME MAKER OF THE**



**SERVEL GAS REFRIGERATOR**

# **ENSIGN**

## **BUTANE- PROPANE CARBURETORS HAVE GONE TO WAR**



## **BUT THEY'LL BE BACK BETTER THAN EVER**

ENSIGN'S modern manufacturing facilities and more than 30 years of experience in producing efficient carburetion equipment are now all-out for Victory. Day and night, we are devoting practically our entire resources to help win the war.

But, although unable to provide our usual prompt service due to the

war's demands, ENSIGN Butane-Propane Carburetion Equipment is still available, and quick delivery of emergency parts is being maintained.

Now, as in the past, ENSIGN Carburetors for Butane-Propane and Gasoline still lead the field for internal combustion engines of all types and sizes.

# **ENSIGN**

**CARBURETOR CO., LTD.  
HUNTINGTON PARK • CALIFORNIA**

Before ordering ENSIGN Butane-Propane Carburetion Equipment or Parts, read W.P.B. General Limitation Order L-86. Copies can be obtained from your nearest W.P.B. office.

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# BUTANE *Power*

## **Fannin Gas & Equipment Buys Butane Transport**

Fannin Gas & Equipment Co., Phoenix, Ariz., has just taken delivery of a new transport truck and trailer to augment the fleet that hauls LP-Gas from Los Angeles to the company's bulk plant in Phoenix and delivers to dealers throughout Arizona. The combined capacity is 6225 gals.

The original gasoline motor was converted to burn butane, as are several other of the firm's trucks.

The tanks were designed and manufactured by the American Pipe & Steel Corp., of Alhambra, Calif.

## **Credit Cards May Now Be Used By Butane Truck Owners**

The Petroleum Administration for War has amended Petroleum Directive No. 62 so that vehicles carrying Certificates of War Necessity may use credit cards at service stations.

By amendment No. 1 commercial vehicles using diesel fuel or butane and carrying Certificates of War Necessity, as well as those granted T ration, are exempted from the credit ban.

## **ODT Amends Order 21 Covering Vehicle Transfers**

Joseph B. Eastman, Director of the Office of Defense Transportation, amended General Order ODT No. 21 Feb. 25 so as to enable the ODT to order control over commercial motor vehicles transferred from one carrier

to another, regardless of the types of carriers involved.

The order originally did not empower the ODT to require the renting or leasing of equipment by a common or contract carrier to a private carrier. The amendment removes this limitation of authority.

## **Orange County, Calif., Farmers Keep Windolph Bros. Busy**

As the domestic load eases up with the coming of spring, farmers begin buying butane for their tractors and trucks, according to L. E. and R. D. Windolph, brothers operating under their own name for many years in Orange county, California. Headquarters are in Santa Ana. And this year has been one of the biggest on record for repair business—probably because Government freezing orders have prevented new conversions in so many cases.

The two largest agricultural users of butane for power are the Segarstrom brothers and the Irvine ranch and these use the fuel almost exclusively for automotive purposes. Also, Windolph butane-equipped trucks are hauling thousands of gallons of butane to war plants now.

## **ODT Appoints A. S. McEvoy To Motor Transport Division**

Alvin S. McEvoy has been appointed to the position of Associate Director, Division of Motor Transport, Office of Defense Transportation.

Mr. McEvoy succeeds Ray G. Ather-ton who has resigned.

# Engine Conversion Costs Repaid Semi-Annually on River Dredge

By LOUIS I. PENTZIEN

General Manager, Omaha Dredge & Dock Co., Omaha, Nebraska

**T**HIS is an account of the conversion of engines from gasoline to butane for the river dredges of the Omaha Dredge & Dock Co. of Omaha, Neb. The improved performance and the reduced cost of operation since the conversions have been so remarkable that we feel our experience should be passed on to the liquefied petroleum gas industry and to users of heavy duty engines who are seeking improvements in their operations.

The importance of what I have to say will be apparent when I state that our fuel costs savings have repaid us twice yearly the full amount of our original conversion investment, and the added savings in oil and labor and the increased benefit resulting from the additional power obtainable cause us to feel a real sense of obligation to the men who sold us this equipment in spite of our opposition to it at first.

This is the story:

## Took a Long Time to Sell

For about a year prior to the fall of 1939, E. Q. Beckwith of the Phillips Petroleum Co., together with Carl A. Nelson, of Butane Gas Co., of Omaha, had been contacting me with the object of convincing me of the practicability, feasibility

and economy of changing some of our power units on hydraulic dredging equipment from gasoline fuel to butane fuel. Owing to the necessity of changing the carburation, the pistons, the combustion chambers and all of the storage tanks, I was reluctant about entertaining their proposition. At this time a certain dredging contract was obtained by the Omaha Dredge & Dock Co. from the U. S. War Dept. for the purpose of preparing by hydraulic dredging a certain pilot canal known as the Big Blue Ben Canal, approximately 10 miles downstream from the A.S.B. bridge at Kansas City, Mo., and all in the Missouri river.

When fuel requirements were computed, with the quotation and potential savings for butane as fuel compared with the prevailing price of gasoline for fuel, it seemed apparent that sufficient volume would be required. This multiplied by the estimated saving between the cost of butane and gasoline would be sufficient to pay for the changes if made on both large dredges, meaning thereby the conversion of five power units to use butane.

Consequently, the order was given to Butane Gas Corp., which was to work with the engineering de-



One of the two river dredges of the Omaha Dredge & Dock Co., Omaha, Neb., both of which are powered with butane burning gas engines.

partment of the Phillips Petroleum Co., that their recommendation should be submitted to make the conversion. When these recommendations were received the Omaha Dredge & Dock Co. had piston patterns made so that the normal piston was lengthened to reduce the combustion chamber and acquire a higher compression. The special patterns became necessary because of the length of ring travel in the existing blocks. The usual number of compression and oil seal rings was provided; carburetion was also changed as designed and recommended by Mr. Nelson and Mr. Beckwith. Three 1000-gal. storage tanks were purchased, one being installed on each large dredge and the third being used for transportation by barge from transport truck to dredge storage tank. Two

pump and engine units were purchased to pump the fuel from the transport to the dredge company's transport tanks and thence into the dredge storage tanks.

The equipment change required about six weeks because conversion was being done without material interruption of active work.

Owing to this process we did not consume as large a quantity of butane as originally anticipated because we kept on using gasoline so that our original estimated potential savings in butane fuel cost did not actually materialize. But the resultant data obtained was so satisfactory to the Omaha Dredge & Dock Co. that they acquired an additional 4000-gal. storage tank for butane. Subsequently, we have learned from our operations that we have obtained an increase in power of be-

tween 35% and 38% over our former gasoline power. And we also find that we are only required to change our oil every 400 working hours when originally (while using gasoline) we were required to change every 72 hours, and in most instances every 60 hours. Each oil change required between five and six gallons of high grade lubricating oil.

Since using butane we find that if there is any by-pass of fuel past the compression and oil rings, all such by-passed fuel is a gas and is discharged through breathers in the engine base. Whenever we used gasoline we found that by-passed fuel would enter into the oil chamber and contaminate our oil to the extent that it would be unsafe to operate longer than 60 or 70 hours without changing oil.

We also found that no carbon

whatsoever develops out of the use of butane fuel and that the only indication is a slight yellow-gold discoloration about the size of a half-quarter piece appearing directly where the firing point of the spark plug is located.

Another vital factor is that we were obliged to shim and adjust our main crankshaft bearings approximately every 60 days when using gasoline fuel, but now since using butane fuel we find that we can continue uninterrupted operations for a whole season without requiring adjustments on our main bearings. We now attribute this to the fact that the combustion of butane and its resultant expansion must act similarly to steam in that there is no sharp or sudden impact.

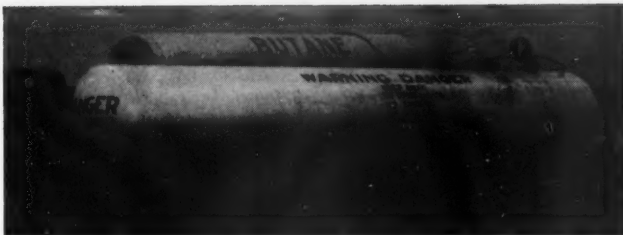
We have been in competition with dredging units using diesel power and have closely compared the two



The skid tank, mounted on barge, which supplies dredge engines with butane. Note the pump in lower left which is used for transferring of fuel.



▲  
Butane bulk plant of the Omaha Dredge & Dock Co. Fuel is furnished by the Butane Gas Corp., of Omaha.  
▼



and find that our equipment reflects very favorably from an economical angle. And so, although using a larger gallonage of butane fuel than we would if using diesel in a diesel unit, the investment or cost per unit per comparable diesel horse power unit is about 40% of the cost of a diesel power unit. Also that the replacement on our units is much more economical and more easily obtained than if we had to maintain and repair a diesel.

We have changed three six-cylinder Twin-City power units from gasoline to butane fuel; also changed two 68 hp. "Cat" power units from gasoline to butane, and we have also changed three 100 hp. V-8 Ford and Mercury units from gasoline to butane and in each and every instance we have obtained 100% satisfactory results.

As regards our operating personnel, we have found that in a day or so our operators, enginemen and oilers became thoroughly familiar with the operation of butane equipment because of its extreme simplicity.


We operate our dredges 24 hours per day, seven days per week, 12 months per year, and under conditions in the summer time with outside temperature over 100° F. and in winter conditions when

the outside temperature was as low as 30° F. below zero. Our engine-rooms are aboard steel hull dredges and enclosed in a corrugated steel cabin. Our insurance rates, including fire insurance protection, and also our workman's compensation protection have not been increased by virtue of the change from gasoline to butane. During three working seasons one of our butane fuel-burning dredges has been leased to the army engineers for improvement work in the Missouri river and the army officers and their subordinate personnel have all expressed their satisfaction of the unit which originally used gasoline but had been changed to butane. Some of the army personnel had worked and were familiar with the identical unit prior to the conversion. Our repair parts consist principally of diaphragms for the carburetors.

Because we have had such highly satisfactory results from changing over our power equipment from gasoline to butane, we are glad to tell others of our experiences and anyone desiring to inspect the manner and method of our conversions to learn why and how we are gaining such efficiency and economy, is welcome to visit our dredge plants and see for himself.

# WARREN

## LIQUEFIED PETROLEUM GAS



Butane and Propane are vital to the success of our Victory Effort; not only in the manufacture of 100-Octane Aviation Gasoline, but on a rapidly growing industrial front—for heat, power and fuel—for use in synthetic rubber and a score of chemicals and plastics. Nevertheless, increased production and facilities insure prompt service to our customers.

**WARREN PETROLEUM CORPORATION**

Tulsa, Oklahoma

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# RESEARCH

● EACH MONTH a competent staff reviews more than 70 publications serving the oil, gas and affiliated industries in a search for those published articles of value to technicians and executives in the liquefied petroleum gas industry. In this department of BUTANE-PROPANE News, brief abstracts of such articles are presented.—Editor.

**Storage of Liquefied Petroleum Gases**—Harry E. Chambers. *Petroleum Engineer*, Jan. 1943, Page 60. In the storage of liquefied petroleum gases there are not many problems considered difficult from the viewpoint of the manufacturer of these gases. Specifications for liquefied petroleum gases require that they be free from moisture and of corrosive impurities; thus the corrosion problem in storage is eliminated. So long as the products stay within these specifications of no moisture and no corrosive impurities the tanks may remain clean. Tanks that have been in service almost 20 years are clean as when installed. There have been many improvements in storage tanks, from the riveted to the all-welded construction, in the types of heads used, and the building of larger size tanks. Regulations governing tank construction; proper gaging, and safe operating practices given important consideration.

**Record Keeping for Small Stores**—Prepared by U. S. Department of Commerce, 1942. Shows how the records of small stores may be kept with a minimum of expenditure of time and effort. It is not a textbook, but does set forth in practical terms the procedures and forms for record keeping

that are necessary for intelligent management. A "one book" system is provided that will furnish the store owners all the business facts necessary for successful management, and also for the preparation of income, social security, Federal excise and State and local tax returns. Copies of this monograph can be obtained from the Superintendent of Documents, Washington, D.C., Committee Print No. 11 and sells for 30 cents per copy.

**20,675,899,000 Barrels Proven Reserves**—W. V. Howard, *Oil and Gas Journal*, Jan. 28, 1943, Page 64. Estimated proven reserves in fields and new pays discovered in 1942 were 322,808,000 bbl., or 23.3% of production for the year. Estimated proven reserves in extensions to older fields were 518,580,000 bbl., or 37.5% of production. Discoveries and extensions in 1942 were 543,140,000 bbl., or 39.2% less than output.

**Tomorrow's Oil Industry**—Wallace A. Craig. *Petroleum World*, Jan. 1943, Page 36. New patents give clues to future trends of producing and refining operations. Recent refining patents refer largely to treating methods and cracking operations with current ratio of new catalytic to new thermal patents about 6 to 1.

**Isomerization—A Useful But as Yet a Little Used Tool for the Refiner**—Arch L. Foster, *Oil and Gas Journal*, Feb. 25, 1943, Page 66. Recent advances show that the newly commercialized isomerization reaction may be

used successfully to make final refined products such as isopentane and isohexane for use in aviation and motor fuels. Some of the more complex isomeric molecules in the  $C_6C_{12}$  range of paraffins may be so produced, either by isomerization alone or by isomerization of smaller molecules and alkylation of these isomers to make the desired product. The possibilities are great for the use of this reaction to form isomers for chemical syntheses; its use for changing structure of heavy hydrocarbons such as lubricating oils, etc., offers still more interesting avenues for research.

**Refiners Face Serious Shortage.**—Arch L. Foster. *Oil and Gas Journal*, Feb. 11, 1943, Page 36. American refiners are plagued by problems of maintaining skilled personnel to operate plants; by uncertainties of adequate crude supply; by reduced yields of "money crops" and in some cases by inability to license and operate the newer processes coming out so rapidly.

The refiner of tomorrow must have the newer processes of catalytic cracking, catalytic isomerization, alkylation and hydrogenation to compete in economic, technical and product-quality aspects with those now building them mainly as war-emergency units. Those who do not now install new processes may be at a distinct disadvantage afterward, especially economically. The refiner will have at his choice, however, the greatest array of technical processes in history, to meet the competitive levels of postwar.

**Calculating Pump Sizes and Hp. of Driver**—F. B. Applegate. *Petroleum World*, Jan. 1943, Page 44. Third and final article of a series on duplex power pumps provides formulae derived from experimental and test data and modified to allow for known variables.

### **Preparation of 1, 3-Butadiene From Petroleum and Its Fractions.**

—By S. V. Lebedev, G. M. Kagan, S. V. Katzman, B. D. Kustrya, V. G. Moor, M. P. Ugryumova, G. S. Shantarovich (Chemical Laboratory of the Leningrad University) *Oil and Gas Journal*, Feb. 11, 1943, Page 61, Part 1. A certain amount of 1,3-butadiene, isoprene and other dienes is known to be formed in pyrolysis of oil. For this reason, petroleum oils could, under favorable conditions, be a desirable material for production of synthetic rubber. The necessary prerequisite for materializing this process consists in finding among the oils or their fractions an easily available material, the resources of which are substantial and the yields of butadiene and isoprene from which are sufficiently high. Consequently, a detailed investigation of crude oils of different types and their fractions from the point of view of preparation of dienes from them is necessary. The present article summarizes some results obtained by the authors during 1926-29. The research pursued two purposes: (1) to determine the conditions for optimal yields of 1,3-butadiene from various oil fractions and (2) to develop a sufficiently precise methods of determination of 1,3-butadiene formed in the process of pyrolysis. Part 2. Feb. 25, 1943. P. 76.

**Rubber Progress Report** — Henry D. Ralph, *Oil and Gas Journal*, Feb. 25, 1943, Page 42. Reduced program will permit production of 241,000 long tons of synthetic during 1943. The synthetic-rubber-plant construction program as recently slowed down by the War Production Board will result in completion of 45.6% of the butadiene program on schedule so that capacity for production of 400,000 tons equivalent of buna-S rubber will be completed by the end of the second quarter of this year.



# LIGHT IN THE NIGHT

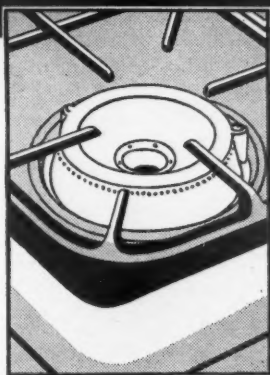
As the darkness of war thickens about us . . . as our own plant continues to turn out war equipment one hundred percent, Caloric engineers and designers focus the light of research upon ideas, designs and materials for the Caloric "Range of the Future". For instance, these Caloric researchers seek to develop an even finer feature for future models than the feature below which helped establish Caloric as the finest gas range in America.



## The last Caloric off the lines before all-out war production contained this feature

This graceful Caloric top burner grate saved gas because it concentrated heat under the food being cooked. Metal was held to a minimum so that, unlike many heavy grates which contained unnecessary amounts of metal, the Caloric grate did not absorb excessive heat and lead it away from the vessel. And this more efficient Caloric grate offered a substantial resting place for the vessel.

Our research light will continue to probe for a finer Caloric to heighten your post-war sales and brighten your customers' kitchens.



**CALORIC GAS STOVE WORKS**  
PHILADELPHIA, PA.



## WPB Appoints Industry Committee

**A**N LP-Gas industry advisory committee has been selected by the War Production Board to act in an advisory capacity concerning regulations affecting the industry. Such action has been contemplated for some time.

The committee, which recently had its first meeting with government representatives in Washington, is made up of men identified with operating companies—producers, distributors and dealers—scattered clear across the United States. Its personnel follows:

Peter Anderson, Utilities Distributors, Inc., Portland, Maine; Frank Boice, Shell Oil Co., Inc., New York; Walter Naumer, "Pyrofax" Gas Division, Carbide and Carbon Chemicals Corp., New York; John Clark, Standard Oil Co. of New Jersey, New York; K. H. Koach, Green's Fuel, Inc., Sarasota, Fla.; Louis Abramson, Jr., Petrolane Gas Corp., New Orleans; George Bach, Skelly Oil Co., Kansas City; C. D. Whittfield, Phillips Petroleum Co., Bartlesville, Okla.; G. L. Brennan, Warren Petroleum Corp., Tulsa, Okla.; W. T. Joplin, Butane Corp., Phoenix, Ariz., and D. D. Purrington, Standard Oil Co. of Calif., San Francisco.

### Louisiana Butadiene Plant Now in Operation

With a rated capacity of 6600 to 9000 tons, the first of the butadiene plants which are to produce raw material from petroleum for the government's synthetic rubber program began operation on Jan. 29 at Baton Rouge, La., according to a report

issued by the Standard Oil Co. (New Jersey).

The estimated output of butadiene from the plant will be sufficient to produce rubber for 1,300,000 to 2,000,000 tires.

Three additional butadiene units at Baton Rouge, wholly or partly financed by the government, are nearing completion.

### American Pipe & Steel Builds Large Addition

The American Pipe & Steel Corp., Alhambra, Calif., is engaged in a plant expansion program which provides for a new unit measuring 48 ft. x 340 ft. This, with the old 195-ft. unit, provides a craneway of 535 ft.

The enlarged plant will be devoted largely to war contracts at this time but will later be utilized in the manufacture of LP-Gas tanks.

### Use of Tin in Gas Meters Restricted

War Production Board Preference Order M-43-b (Part 1001.3) restricts the use of tin in certain gas meters. After Feb. 15, 1943, notwithstanding the provisions of any state statute or governmental regulation, no person shall use tin-bearing solder or other tin-bearing material in the adjustment, internal repair, or resealing of any tin-cased gas meter having a rated capacity of less than 300 cu.ft. per hour except:

(1) A meter which is found not to be accurate within an accuracy range of plus or minus 4% when tested by standard meter prover tests; or

(2) A meter which has not been previously repaired internally for twelve years or more.

The restrictions do not apply to any such gas meter which was withdrawn prior to Jan. 26, 1943, for testing and returning to service.



*End your  
GAS worries*

## WITH AN ALGAS INSTALLATION

War plants and industries are installing Algas "Gas-air" Equipment—a standby gas utility **right on the premises** instantly ready in any emergency to sup-

ply the entire fuel load. Many plants, hundreds of miles from piped gas, depend solely on an Algas installation for low cost, dependable fuel.

*Write for Literature*



*An Algas installation for Phelps-Dodge extrusion plant, Los Angeles.*



### AMERICAN LIQUID GAS CORPORATION

1109 SOUTH SANTA FE AVENUE, LOS ANGELES, CALIFORNIA

## Carter Oil Co. Acquires Large Montana Company

The assets of the Santa Rita Oil & Gas Co., a Montana corporation, of Cut Bank, Mont., including its two wholly owned subsidiaries, Northwest Refining Co. and Santa Rita Purchasing and Storage Co., were acquired by The Carter Oil Co., of Tulsa, Okla., through a purchase agreement consummated Dec. 31.

Announcement of the transaction was made jointly by L. F. McCollum, president of Carter Oil, and Louis B. "Tip" O'Neil, president of the Santa Rita companies.

Through the acquisition of these holdings, Carter for the first time enters the refining and retail marketing field. Santa Rita and its subsidiary

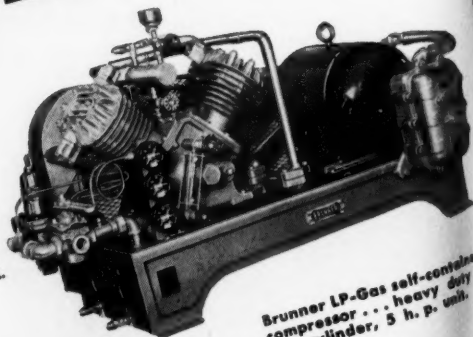
companies will retain their corporate identities operating under the direction of Carter Oil Co.

Santa Rita's producing assets include approximately 2100 barrels of production daily from 85 wells on 3200 developed acres in the Cut Bank pool in Northwestern Montana. Production is principally from the Cut Bank and Sunburst sands. The company has under lease considerable acreage in Montana in the Cut Bank and adjacent areas.

Northwest's refinery, located at Cut Bank, is currently processing approximately 3500 barrels of crude daily and the company's retail marketing territory for bottled gas and other refined products extends east to North Dakota and west to Spokane, Wash.

# 500 TO 1000 LBS. LP-GAS SAVED Per Tank Car wherever Brunner Units operate

Liquid Petroleum Gas operators using the Brunner LP-Gas Unit recover 500 to 1000 lbs. of gas from every tank car unloaded. This saving alone quickly pays for the initial cost of the Brunner self-contained unit. And because LP-Gas is a necessity in many defense areas, this gas saving is important as a conservation measure. Brunner Manufacturing Company, Utica, New York, U. S. A.

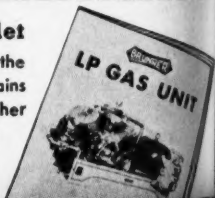


Brunner LP-Gas self-contained compressor . . . heavy duty cylinder, 5 h. p. unit.



### Write for FREE Booklet

The new booklet describes the Brunner LP-Gas Unit, contains illustrations, diagrams and other pertinent facts on handling liquid petroleum gas.





## Random Shots At The Parade

By W. W. BANKS

Do you realize that in America there are more than 2,000,000 families who are depending on L-P Gases for high quality, low cost fuel? Yes, these families depend on our industry for carrying on the important business of living.



being replaced, even where available in ample quantities, by more efficient L-P Gases. Here is a big educational job for our industry. When conditions get back to normal we must educate the public upon the superiority of L-P Gases as fuel. We should be giving thought now to this important matter.

As we have mentioned before in this column, the war program comes first and our industry is closely identified with it. This thought was further borne out at a recent meeting of the Interstate Oil Compact Commission in making public their findings which included new uses and new products to aid the war effort and help mankind.

B.T.U.'s lost up the chimney is another of the many reasons why wood fuels are

### Buy War Bonds!



**DALLAS AND TANK**  
**WELDING COMPANY, INC.**  
201-5 W. COMMERCE ST. DALLAS, TEXAS

# SPRAGUE METERS

*for*

PROPANE - BUTANE SERVICE

•

*Write for Particulars*

## SPRAGUE METER COMPANY

Bridgeport, Conn.  
Los Angeles, Calif.  
San Francisco, Calif.

# ECONOMICAL SAFE PRESSURE TANKS

*for*

ALL PURPOSES  
AMERICAN  
PIPE & STEEL CORPORATION

Manufacturers and Distributors  
Alhambra, California

## Decentralization Ordered of War Production Board

Another long step in the decentralization of War Production Board activities was made public Feb. 24 when Chairman Donald M. Nelson announced a new WPB administrative order which directs that after March 1 applications for priority assistance on Form PD-1A be filed with the nearest of the 131 WPB district offices and authorizes the 12 regional offices, beginning March 15, to assign preference ratings on PD-1A certificates to deliveries of materials valued at \$100 or less.

Under the new procedure, which will simplify greatly the problems of business men and others needing occasional priority assistance, WPB's field offices will be responsible for seeing that all PD-1A applications are properly filled out and will forward them to Washington, or to the regional offices if they fall within the value limitations set by the order.

◆ ◆

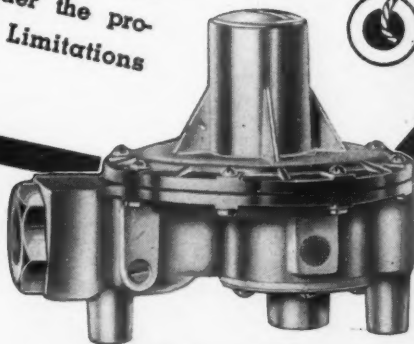
## Servel Service Manual Offered LP-Gas Industry

A very comprehensive and attractive booklet has been prepared by Servel Inc., Evansville, Ind., which is intended for use by gas companies to educate domestic users on the importance of maintaining refrigerators, ranges, and other gas appliances in adequate service for the duration.

It contains many helpful hints of specific value and is attractively bound in our National colors. It contains 32 pages of information that should be in the hands of everyone owning an LP-Gas operated refrigerator, gas range, water heater, etc. This pamphlet is available to any LP-Gas dealer or distributor in quantities at the nominal charge of two cents per copy.

**PROMPT DELIVERY!**

New Fisher LPG Regulators can still be supplied under the provisions of General Limitations Order No. L-86.



**FISHER**

## Type 721 REGULATOR

With the largest capacity of any medium size regulator on the market, the Type 721 will handle all domestic and normal commercial loads. Furnished for single drum service with various inlet and outlet connections, or for multiple drum service with different pigtail and manifold assemblies.

**Capacity up to 120 cu. ft. per hour or more.**

**Setting — 11" W.C. at 30 cu. ft. per hour  
100 lb. inlet.**

**Relief Valve — built-in, set for 1 lb. and sealed.**

All Fisher LPG Regulators fully described and priced in Bulletin 42-D.  
Write for your copy.

**FISHER GOVERNOR COMPANY**  
947 Fisher Bldg., MARSHALLTOWN, IOWA

APRIL-1943

## New Order Superseding P-46 Specifically Covers LP-Gas

Preference Rating Order P-46 has been revoked and superseded by Utilities Order No. U-1. Order P-46 did not provide maintenance and repair materials for the LP-Gas industry.

Utilities Order U-1 appears to be a far reaching document and every members should study it carefully to determine whether or not his operations may be affected by it.

U-1-b is a supplementary order which specifies under what conditions exceptions will be made, and is dated Feb. 25.

## OPA Simplifies Procedure For Stove Ceiling Prices

Simplification of the procedure for setting ceiling prices at wholesale and retail on new models of domestic cooking and heating stoves was pro-



In the interest of gas saving, when there's baking to be done, utilize one space as much as possible, urges the WPB. Cakes, baked fruit or vegetables, and casserole dishes are fine economical companions in an oven.

—(Photo by Office of War Information.)

vided by the Office of Price Administration Feb. 11 with the establishment of a method by which OPA may set both wholesale and retail ceilings at the same time that it establishes the manufacturer's maximum price.

This provision is formally set out in Amendment No. 4 to Revised Price Regulation No. 64—Domestic and Heating Stoves—and became effective Feb. 16.

## Allen Butane Installs New Storage Tank at Fort Worth

Allen Butane Gas and Equipment Co., of Fort Worth and Denton, Texas, is installing a new butane storage tank at Fort Worth. The capacity of the tank is 6700 water gallons.

This company, in which J. E. Allen, Scott Simms and E. L. Atkins are partners in ownership, recently purchased Butane Gas Sales Co., of Denton from Fred Greenwood who went into the armed services. Headquarters of the company are on the Jacksboro Highway and Azele Ave., Fort Worth. The company operates three transport trucks and seven delivery trucks.

## Amendment Specifies How to Appeal LP-Gas Orders

An amendment to Schedule A of Priorities Regulation No. 16 adds the following orders, of interest to LP-Gas men, to the list of orders for which appeals for relief from restrictions imposed, must now be filed only through WPB field offices:

LP-23 (Domestic Cooking Appliances). Appeal must be filed on PD-203.

L-79 (Plumbing and Heating Equipment). Appeal must be filed by letter.

L-173 (Domestic Space Heaters). Appeal must be filed by letter.

L-185 (Water Heaters). Appeal must be filed by letter.





## WHEN HER CHICKENS COME HOME TO ROOST

● She's buying War Bonds today, and dreaming about a happier day when those warbirds will come streaming home to a victorious America.

The War Bonds you urge her to buy now will give her the things she desires most in the future. At the head of her list you'll find a new Roper (LP) gas range. Yes, there's a great day coming—if we all do our part to help win the war.

CARE and OPERATION  
of the new  
ROPER GAS RANGE

TOP-OF-RANGE DIRECTIONS  
BROILING DIRECTIONS  
OVEN DIRECTIONS  
CANNING DIRECTIONS

It's important for her to take care of the gas range in her kitchen. It's important that she uses it wisely, makes it last, conserves fuel and saves the nutritive value of foods. Write for this Free sample booklet.

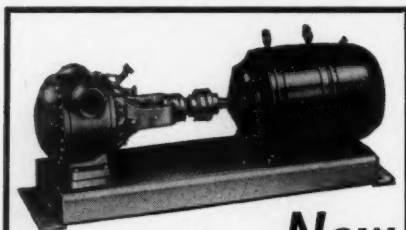
Buy WAR BONDS Now

A ROPER (LP) GAS RANGE Later

**GEO. D. ROPER**  
CORPORATION

GENERAL SALES OFFICE AND PLANT: ROCKFORD, ILLINOIS

ROPER GAS RANGES FOR ALL GASES INCLUDING (LP) LIQUEFIED PETROLEUM GAS



**New**  
Model 210

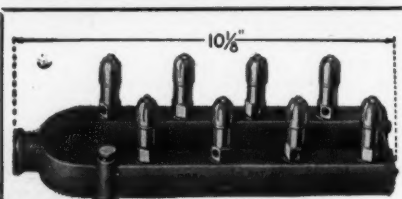
## SMITH PUMPS

meet every requirement. The balanced gear construction of SMITH Butane-Propane PUMPS reduces internal wear. Fluid sealed packing box makes hazardous gas leaks impossible.

Order Model 211 for truck mounting.

Immediate Delivery

**SMITH Precision Products COMPANY**  
1135 MISSION ST. SOUTH PASADENA, CALIF.



No. C. L.-80 Barber Burner

## BARBER BURNERS APPLIANCE

Barber is now working on war production, but wherever possible and permitted, we are still supplying the regular trade. Barber Units, in many standard or special shapes and sizes, are always correctly designed to fit the individual appliance, and give complete combustion on Butane-Propane or any other gas. Now that efficiency is more vital than ever—submit your burner problems to us. Complete catalog on request.

**THE BARBER GAS BURNER CO.**  
3704 Superior Ave. Cleveland, Ohio

## LPGA Executive Board Orders Washington Office Closed

At the first meeting of the new executive board of the Liquefied Petroleum Gas Association, held in Washington this month, it was decided to close the association's Washington office which has been maintained for many months to assist members of the industry seeking aid from the WPB and to supply needed information to Government bodies.

A new LP-Gas industry committee, appointed by the WPB, will now act in an advisory capacity when new or amended orders are contemplated.

## WPB Approves 30 Trailer Units for LP-Gas Use

A new program for the immediate construction of 200 large-capacity tank trailer units to free needed tank cars for the long-haul movement of petroleum products was announced Feb. 15 by the ODT, following approval by WPB.

The equipment, which will be built on order for individual applicants will include 30 semi-trailers of a maximum capacity of 3,000 gals. for the transportation of LP-Gases.

It is expected the newly approved units will be completed by April 1.

## Preference Ratings Excluded For Liquefied Petroleum Gases

The War Production Board has issued Preference Rating Exclusion Order M-201 which prohibits the use of preference ratings for the purpose of securing certain specified petroleum products.

Among others are named liquefied petroleum gases. Exceptions can be obtained only by applying to the Petroleum Administration for War on Form PD-1A, accompanied by letter in triplicate stating reasons for exceptions.

TO ALL

# Natural Gasoline Men

## *Greetings*

*From the*

**NATURAL GASOLINE SUPPLY MEN'S ASSOCIATION**

**We are looking forward to seeing you**

*at the*

**TWENTY-SECOND ANNUAL CONVENTION**

*of the*

**NATURAL GASOLINE ASSOCIATION  
OF AMERICA**

**April 14-16, Baker Hotel, Dallas, Texas**

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**MEMBERS OF THE NATURAL GASOLINE SUPPLY MEN'S ASSOCIATION**

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Woodbank Pump & Machinery Company  
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Wyatt Metal & Boiler Works  
John Zink Company

## Best Way to Fight New Fire Bomb Is With Direct Stream of Water

**I**NSTRUMENTS for coping with new types of enemy fire bombs were issued by OCD Director Landis.

The enemy recently has employed new types of bombs—both large incendiaries and the usual small type with a more powerful explosive charge set off by a time fuse. Experience with these bombs in other countries and our own study of the techniques developed to cope with them make it clear, the OCD said, that fire continues to be a most important weapon, and that, against fire, water is still the best weapon.

Among the new enemy bombs are:

a. The usual 2.2-lb. fire bomb, with an extension of the nose containing a larger explosive charge. The total weight is increased to five pounds. The incendiary section of the bomb ignites upon landing, but the explosive charge may go off at any time up to seven minutes later.

b. A combination incendiary and high explosive bomb. Almost immediately after ejecting incendiary units on impact, a 12-lb. charge of TNT in the nose of the bomb explodes.

c. A phosphorus-oil bomb. The sticky liquid contents ignite spontaneously because of the phosphorus. The phosphorus may be extinguished by water but will break into fire again if allowed to become dry.

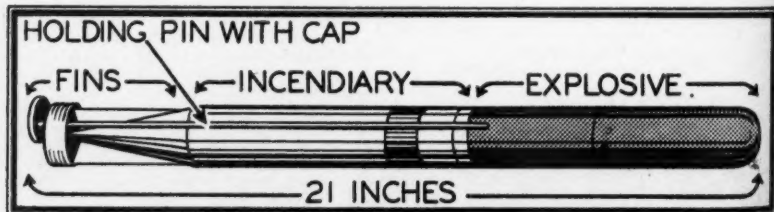
d. A Japanese bomb weighing about 110 lbs. and containing, besides a quantity of thermit, a considerable number of rectangular-

shaped rubber-impregnated incendiary pellets which scatter widely and start a substantial number of small fires which may be attacked immediately.

The most effective method of attacking fires caused by these bombs, according to OCD instructions, is a jet or direct stream of water. The small fire bomb without explosive charge is still the most widely used of all types except by the Japanese. If bombs fall where they cannot start fire and cannot be seen from the air, they should be left to burn themselves out, but elsewhere they must be attacked.

Mr. Landis said that the increased danger from explosion makes the use of sand, a spray of water and other short-range methods of attack less reliable than ever, and for that reason the use of these methods is not being recommended.

"These new small explosive incendiaries are a good deal more dangerous than the type previously used," Mr. Landis said: "In spite of the increased personal risk, they must be attacked promptly by civilians when they fall in congested districts or where there is little fireproof construction."



New type of explosive fire bomb.

"---have found Tite Seal most effective"

And so have many other users in the L. P. Gas industry. TiteSeal does not harden

or dry out permitting gas to escape. TiteSeal stays soft and pliable, makes a permanently leak-proof joint, yet permits

SAYS ALVIN FLANNES  
DAY & NIGHT MANUFACTURING CO.  
MONROVIA, CALIF.

easy disconnection for service or repairs.

#### WRITE FOR SAMPLE

If you haven't used TiteSeal, write us today for a generous sample. End your gas-leak troubles with this perfect sealing compound.

Gas-Proof Heat-Proof Non-Solvent



## TiteSeal

DIVISION OF

# RADIATOR SPECIALTY COMPANY

LOS ANGELES

CHARLOTTE, N. C.

TORONTO

## REZNOR

### UNIT HEATER PROTECTION

### FOR VITAL WAR WORKERS EVERYWHERE

TODAY we must protect America's men and women who serve on the production lines. Therefore, these people need heat-comfort so they can work more efficiently with less time off for illness due to fatigue, colds, coughs, etc. Reznor Gas Fired Unit Heaters provide the answer to this problem. Furthermore, Reznor Equipment may be installed at far lower cost with fewer men, and in less time than other types of heaters. They move more warm air during winter and provide greater air circulation during summer—more war production results. Write today for literature.

**REZNOR MANUFACTURING CO.**

304 James St.

Mercer, Penna.

"GAS HEATERS EXCLUSIVELY SINCE 1888"



## Superior FLARE FITTINGS

*Especially For*

**L. P. G. INSTALLATIONS**

SAE (Flare) Unions,  
Couplings, Adapt-  
ers, Elbows, Tees,  
Crosses and Nuts

Listed as Standard by  
**UNDERWRITERS  
LABORATORIES,  
INC.**



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**SUPERIOR VALVE & FITTINGS CO.**  
1309 WEST LIBERTY AVENUE  
PITTSBURGH • PENNSYLVANIA

Order These Famous L. P. Gas  
Products From Us . . . :



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**THE DAYTON-DOWD CO.**

**Hackney**  
BUTANE-PROPANE CYLINDERS

**L.C. RONEY INC.**

**The IMPERIAL  
BRASS MFG. CO.**

**GAS EQUIPMENT CO., INC.**  
2620 South Ervay Street, Dallas, Texas  
**GAS EQUIPMENT SUPPLY CO.**

## ANSWERS

### To Chapter 18 The Bottled Gas Manual

Here are the answers to the questions on Page 42 and which refer to problems in Chapter 18 of THE BOTTLED GAS MANUAL:

1. Carbon, hydrogen, sulphur, oxygen, nitrogen.
2. Sulphuric acid.
3. Ratio of fixed carbon to volatile combustible matter.
4. Bituminous.
5. The presence of volatile combustible matter in larger amounts.
- 6A. Five per cent.
- B. 17.53 lbs. of coal to 1 lb. of propane.
- 7A. Ten per cent.
- B. 9.5 lbs. of coal to 1 lb. of propane.
- 8A. Fifteen per cent.
- B. 6.82 lbs. of coal to 1 lb. of propane.
- 9A. Intermittent operation of gas heater doing the same job.
- B. Less input by the gas heater accomplishing the same task.
10. Its inflexibility.



### W. G. Brumit, Gone Two Years, Rejoins Dallas Tank & Welding

W. G. Brumit, formerly shop superintendent of Dallas Tank & Welding Co., Dallas, Texas, has returned to this post after two years of service with another company, according to an announcement of W. W. Banks, president of the company.

**BUTANE-PROPANE News**



# For Greater STABILITY

IN DEHYDRATED BUTANE AND PROPANE

A Higher Quality Product . . . . A More Dependable Source of Supply . . . . A Product that will secure for you a list of customers more satisfied with a fuel giving trouble-free and efficient service . . . . try Carter Propane and Butane.

Write for complete information to: The Carter Oil Company, Marketing Department, Room 928, National Bank of Tulsa Building, Tulsa, Oklahoma.

DEHYDRATED  
*Propane and Butane*

**THE CARTER OIL COMPANY**

TULSA, OKLAHOMA

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**1941**  
**YESTERDAY**  
Payneheat  
for the  
homes of  
America.

**TODAY**  
Precision  
parts for  
the arms of  
Democracy.

**TOMORROW**  
Still finer  
furnaces for the  
gas industry's  
post-war  
expansion.

# PAYNEHEAT

*Payne* FURNACE & SUPPLY CO., INC., BEVERLY HILLS, CALIFORNIA

APRIL-1943

67

## Charles E. Wilson Is Named To Production-Resources Board

Chairman Donald M. Nelson of the War Production Board has announced a change in his staff. Vice Chairman Charles E. Wilson has been named Mr. Nelson's deputy on the combined Production and Resources Board, the function of which is to integrate the production efforts of the United States and the United Kingdom.

Mr. Wilson, who will hold his new position in addition to his post of production vice chairman of WPB, succeeds James S. Knowlson, who resigned recently to return to private industry.

## K. Eldon Forms Company To Build Aircraft Fittings

K. Eldon, for some years identified with the LP-Gas industry, has formed a company in Dallas, Texas, to manufacture small aircraft fittings. It is called the Lone Star Aircraft Co.

Mr. Eldon was formerly associated

with the J & S Carburetor Co. He expects to return to the butane industry at the close of the war.

## Oil Compact Commission Meets April 2-3, Wichita, Kan.

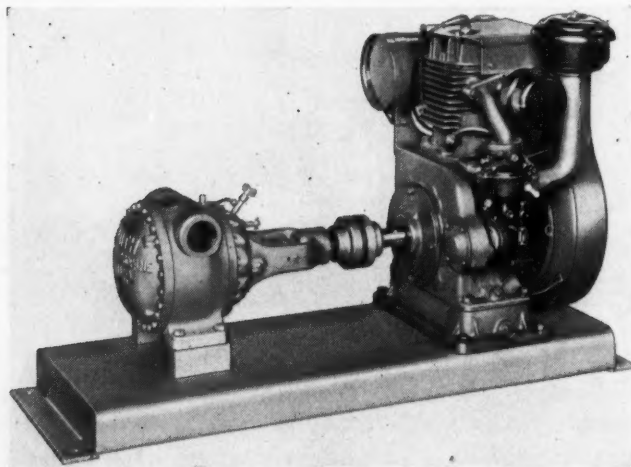
The spring quarterly meeting of the Interstate Oil Compact Commission has been set for April 2 and 3 at Wichita, Kan.

Plans for the meeting include discussion of steps for completion of a national engineering survey of stripper oil fields and secondary recovery methods.

## F. A. Henninger Assigned To Florida Naval Air Base

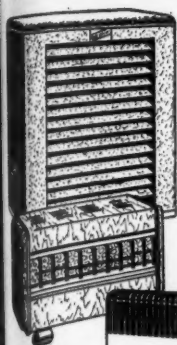
F. A. Henninger, vice president of the McNamar Boiler & Tank Co., Tulsa, Okla., has received orders to report to the naval air base at Jacksonville, Fla.

Mr. Henninger has been commissioned a lieutenant and definitely assigned to the Bureau of Aeronautics.



Special army needs at Camp Roberts are being supplied by this Smith butane-propane pump. It is a Model 210, direct connected to a 7½-hp. air cooled gasoline engine, and manufactured by the Smith Precision Products Co., South Pasadena, Calif.

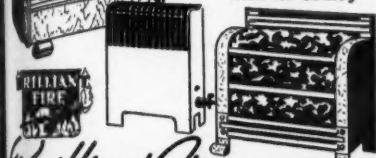
## WAR HOUSING



### LPG HEATERS

LPG Dealers find real profit in **BRILLIANT FIRE** sales because the product is time-tested, trustworthy. Geared for economy operation and negligible servicing. These popular heat-makers are offered in a variety of styles for every home need.

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*Brilliant Fire* GAS HEATERS

THE OHIO FOUNDRY & MANUFACTURING CO.

QUALITY HEATING EQUIPMENT SINCE 1846  
STEUBENVILLE, OHIO

## We are not forgetting

Though we have converted all our facilities to war production, we are not forgetting our customers in the LP-Gas industry.

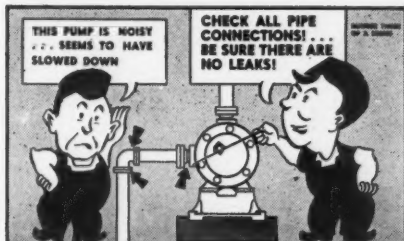
When the war is won we shall do everything to maintain our reputation as manufacturers of first quality LP-Gas equipment.

## McNAMAR

BOILER & TANK COMPANY

Tulsa, Okla.

Salem, Ill.



## How To Get the Most Work Out Of Your VIKING PUMPS

For efficient operation of Viking Rotary Pumps it is essential that all pipe lines be tight. Use shellac, glycerin-litharge or some other good compound in making up your pipe joints. Periodical inspection of your suction line is important. A small air leak will decrease your pump capacity and cause it to be noisy. Check all pipe joints and unions frequently; also the packing in your swing joints and valve stems.

Get extra wear out of your Viking Pumps by giving them extra care. The Viking Service Manual tells you how. It's a handy, illustrated booklet giving you practical help in mounting, operating and maintaining Viking Pumps. Write for your copy today. It's FREE.



**VIKING PUMP COMPANY**  
CEDAR FALLS, IOWA



## L.C. RONEY, INC.

meets the demands of the nation. Our plant has gone to war for the duration—but when peace comes, L. C. RONEY products for the LP-Gas industry will meet the demands of dealers everywhere. In the meantime—our stock of LP-Gas equipment is still complete.

**L.C. RONEY INC.**  
1740 44th ST. • LOS ANGELES, CALIF.

## HOT Water UNITED STATES

*Automatic Water Heaters*

Approved by A.G.A. for  
Liquefied Petroleum Gas

**United States Heater Co.**  
COMPTON, CALIFORNIA

### *Victory Is Everyone's Job* **ELECTRIC & CARBURETOR ENGINEERING CO.**

*"Pioneers of the Butane Industry"*  
For the duration of the war we are engaged 100% in manufacturing AIRCRAFT PRECISION PRODUCTS. After the war we will again present our regular lines and solicit your patronage.

**ELECTRIC & CARBURETOR  
ENGINEERING CO.**  
2323 E. 8th St. Los Angeles

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Classified advertising is set in 6-point type, without border or display, at the rate of 10 cents per word per insertion; minimum charge per insertion \$2. Box numbers for replies count as 5 words. Count as a word each one letter word and each group of figures. Classified advertising is only accepted when payment accompanies order. Copy and payment must reach publisher's office prior to 10th of month preceding publication.

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WANTED TO BUY—APPROXIMATELY 3000 Gallon Capacity Transport Truck, New or Used. GOOD HOUSEKEEPING APPLIANCE CO., Inc., 1312 St. Stephens Road, Mobile, Ala.

WANTED: PROPANE STORAGE TANK, 1500 to 2000 gallon, new or used. Also Cylinders, 20 to 100 lbs. Butane Gas & Appliance Co., 7900 Watson Road, St. Louis County, Mo.

### BUSINESS WANTED

Will buy LP-Gas service, equipment and appliances in Southern California. Give full details. Write Box 105, BUTANE-PROPANE NEWS, 1709 W. 8th St., Los Angeles, Calif.

### Skelgas Division, Skelly Oil Co., Launches "Hearth and Home"

"Hearth and Home" is the appealing title of a new magazine launched by the Skelgas Division of Skelly Oil Co., Kansas City, for distribution through its dealers to customers and prospects.

Designed especially to bring timely assistance to homemakers, the monthly contains a variety of material from recipes to budget wardrobe planning. Other members of the consumer family from Father to Junior will find topics of interest in "Hearth and Home" on the pages where sports, crossword puzzles, Hollywood headlines and fiction are covered.

A space is provided on the last page of the paper where the dealer may imprint his name.

BUTANE-PROPANE NEWS

*For Safety  
and Economy*

# ETHYL MERCAPTAN

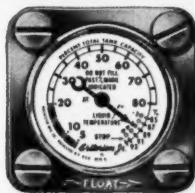
*Purified*

The **ACCEPTED**  
standard  
odorant  
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**MALLINCKRODT  
CHEMICAL WORKS**

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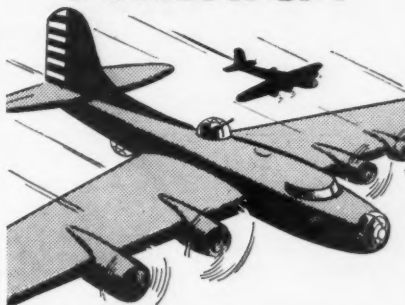
## LONG WILL THEY SERVE!

... that's because Rochester Gauges are carefully designed and durably built to serve with greater accuracy and dependability throughout the present emergency.

ROCHESTER MFG. CO., INC.  
17 Rockwood St., Rochester, N. Y.

**ROCHESTER**  
*Criterion GAUGES*

# WINGS OVER AMERICA



## also depend upon **SINCLAIR LP-GASES**

For power, speed and sustained performance, America's growing fleet of Flying Fortresses, Dive Bombers and Pursuit Planes depends upon High Octane Aviation Gasoline, an important American contribution to the successful prosecution of today's war and tomorrow's peace-time industry.

And whether you are furnishing Butane and Propane for home fires or factory forge; for shipyard or chemical plant, you'll be supplying these same vital qualities of heat, power and fuel in Sinclair's LP-Gases.

Our distributors are helping us discharge the important war-time task of supplying this vital material on military, industrial and domestic fronts.

*Protect your fuel requirements  
by contracting with*

## **SINCLAIR PRAIRIE OIL COMPANY**

Liquefied Petroleum Gas Division  
Sinclair Bldg. Tulsa, Okla.

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# Entirely Rewritten Handbook BUTANE-PROPANE GASES

**481 Pages of Up-to-Date LP-Gas Information, Charts, Diagrams and Photographs**

**\$5<sup>00</sup>**

## **CHECK THE NEW CONTENTS**

### **PART 1. INTRODUCTION**

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